



City Research Online

City, University of London Institutional Repository

Citation: Goold, P. (2019). Patent Accidents: Questioning Strict Liability in Patent Law (City Law School (CLS) Research Paper No. 2019/05). London, UK: The City Law School.

This is the published version of the paper.

This version of the publication may differ from the final published version.

Permanent repository link: <http://openaccess.city.ac.uk/id/eprint/22888/>

Link to published version: City Law School (CLS) Research Paper No. 2019/05

Copyright and reuse: City Research Online aims to make research outputs of City, University of London available to a wider audience. Copyright and Moral Rights remain with the author(s) and/or copyright holders. URLs from City Research Online may be freely distributed and linked to.

City Research Online: <http://openaccess.city.ac.uk/> publications@city.ac.uk



**THE CITY
LAW SCHOOL**
CITY UNIVERSITY OF LONDON
— EST 1894 —

Academic excellence for business and the professions



City Law School Research Paper 2019/05

Patent Accidents: Questioning Strict Liability in Patent Law

Patrick R Goold

12/09/2019

Patrick R. Goold
The City Law School

This text may be downloaded for personal research purposes only. Any additional reproduction for other purposes, whether in hard copy or electronically, requires the consent of the author(s). If cited or quoted, reference should be made to the name(s) of the author(s), the title, the number, and the working paper series

All rights reserved.

© 2019

The City Law School Working Paper Series are published by The City Law School, City University
London, Northampton Square, London, EC1V 0HB.

An index to the working papers in The City Law School Working Paper Series is located at:
www.city.ac.uk/law/research/working-papers

Patent Accidents: Questioning Strict Liability in Patent Law

Forthcoming in *Indiana Law Journal*

Patrick Goold*

Abstract

Accidental infringement of patent rights is a pervasive and growing problem in the Information Age. As IP rights proliferate and expand in scope, it is becoming increasingly easy for companies and individuals to inadvertently infringe patents. When such accidental infringement occurs, patent law holds the infringer strictly liable. This contrasts with many areas of tort law where defendants are only liable if they act negligently.

This Article questions the normative desirability of strict liability in patent infringement cases. Assuming the primary value of patent law is utilitarian, the Article poses the research question: What liability rule will maximize social welfare? The Article answers the question theoretically by applying economic models of accidents developed in tort law literature. The research finds that a negligence rule is preferable. Unlike strict liability, negligence liability will encourage both patentees and technology users to take reasonable measures to prevent accidental infringement, and thus minimize the social cost of patent accidents. Therefore, the Article recommends reforms to the liability rule in direct patent infringement cases. Defendants should be liable for accidental patent infringement only when they fail to adopt reasonable care to avoid the infringement.

I. Introduction	4
II. Patent Accidents	7
A. The Anatomy of Patent Accidents	7
B. The Causes of Patent Accidents	11
C. Literature Review	13
1. Strict Liability Proposals.....	13
2. Independent Invention Proposals	15
3. Negligence Proposals	16
III. The Case for Negligence.....	18
A. The Social Cost of Patent Accidents	18
1. Accident Costs	18
2. Precaution Costs.....	19
3. Minimizing the Total Costs	20
B. Liability Rules Compared: Primary Considerations	23
1. No Liability	23
2. Strict Liability	24
3. Negligence	25
C. Liability Rules Compared: Secondary Considerations	27
1. Activity Levels.....	27
2. Administrative Cost	30
3. Error Cost.....	31
4. Externalities	32
D. Summary	34

* Patrick R. Goold, Lecturer in Law, The City Law School. The author would like to thank BJ Ard, Oren Bracha, Tun Jen Chiang, Yotam Kaplan, Oskar Liivak, Henry Smith for comments on the Article. The author would also like to thank Michael Meurer, Jim Balsillie, Sean Silcoff, Terry J. Zakreski QC, for helpful discussions on the topic. Special gratitude is owed to Oskar Liivak who initially coined the term “Patent Accidents”. All errors and omissions are the responsibility of the author. Copyright in the work is retained by the author.

IV. Implementing Negligence.....	36
A. Existing Legal Regimes	36
1. U.S. Patent Act.....	36
2. U.K. Patent Act	38
B. A Patent Negligence Defense.....	39
C. Illustrative Applications	42
1. <i>NTP v RIM</i> : Patent Thickets and Patent Trolls	42
2. <i>Rambus v Infineon</i> : Strategic Behavior.....	44
3. <i>Monstanto v Schmeiser</i> : Self-Replicating Technologies	45
V. Conclusion	46

I. Introduction

In 1999, Canadian company, Research in Motion (RIM), launched the Blackberry email pager.¹ The pager was an instant commercial success amongst businesspeople and politicians alike. Behind the Blackberry's success was its wireless email technology. No longer were emails confined to the desktop but were now easily accessible on-the-go. The technology for which had been invented by RIM founder Mike Lazaridis in the mid-1990s; or so Lazaridis thought. The following year, RIM received a letter from a small Virginia-based company called NTP.² The letter alleged that the Blackberry infringed patents NTP held covering wireless technology that an engineer, Thomas Campana, had invented in the mid-1980s. This infringement letter came as a shock to RIM. Only a few months earlier RIM had received its own US patent on Blackberry's email technology.³ As far as RIM was concerned they had created the technology and had the patent to prove it! Yet NTP won their infringement case in Virginia, securing an injunction that threatened to bring the production of Blackberries to a halt.⁴ To avoid a complete shutdown, RIM ultimately paid NTP an exorbitant license fee of \$612.5 million in 2006.⁵ But should RIM have been held responsible for this patent infringement? Ought we to hold companies liable for infringing patents of which they were unaware and could not reasonably have been expected to know about? In most areas of civil law one is only liable for such accidents if one has behaved negligently.⁶ Run a pedestrian over in your car and you will only be accountable if you failed to take the care of a reasonable person. But infringe a patent accidentally and you are liable even if you behaved exactly as society would expect. Why is patent law the exception?

Accidental patent infringement is a pervasive and growing problem. Property rights in tangible property can only be infringed by a limited number of individuals who are in close physical proximity to the tangible good. By contrast, due to the nature of intangibles, patents can be infringed by multiple people regardless of their location. Furthermore, unlike physical goods, with readily ascertainable boundaries, the scope of patent boundaries is unpredictable. Ideally a nation's patent register ought to give the public a clear picture of what is, and what is not, subject to a patent. But patent law literature already provides evidence of a number of barriers and obstacles which prevent registers performing this function as well as we would hope.⁷ As a result, it is all too easy for even a diligent company to become an accidental infringer, and the amount

¹ See JACQUIE MCNISH & SEAN SILCOFF, *LOSING THE SIGNAL: THE UNTOLD STORY BEHIND THE EXTRAORDINARY RISE AND SPECTACULAR FALL OF BLACKBERRY* 67-78 (2018). Later, in 2002/3, the Blackberry would evolve into the more famous mobile cell phone.

² *Id.* at 123.

³ *Id.* See also *Pager Maker Gets Patent for E-Mail Delivery*, WALL ST. J. (May 18, 2001).

⁴ *NTP, Inc. v. Research in Motion, Ltd.* 270 F. Supp. 2d 751 (D. Va. 2003).

⁵ 'RIM's Sensible Patent Payout Keeps BlackBerry Users Hooked', WALL ST. J. (March 6, 2006) <https://www.wsj.com/articles/SB114160357490989930>.

⁶ 2 DAN B. DOBBS ET AL., *THE LAW OF TORTS* § 437, at 842 (2011); JOHN C.P. GOLDBERG & BENJAMIN C. ZIPURSKY, *THE OXFORD INTRODUCTIONS TO U.S. LAW: TORTS* 265-66 (2010) (strict liability exists at "the margins of tort," and is applicable in "a few special situations").

⁷ See *infra* Part II.B.

of such infringement is worrisome. Scholars of patent law today describe the problem of inadvertent patent infringement as “significant” and “getting worse”.⁸ Recent empirical evidence hints that perhaps as much as 89% of litigated patent infringements are unintentional and inadvertent.⁹ Buy a wireless router to use in your small business, and you may unknowingly be using technology that was not licensed by the proprietor; incorporate Bluetooth technology into a new cellphone after searching the patent register, and you may be inadvertently manufacturing a technology whose patent information was buried under a mountain of similar patents; grow crops on your farm and you may later find such crops germinated from patented seeds which were blown by the wind from nearby farm land.

This Article questions the role of strict liability in accidental infringement cases. This is not an uncontroversial question; the strict liability standard in patent law is hotly debated.¹⁰ Those in favor of a strict liability standard have argued that a fault-based liability rule would be too administratively costly to implement, that such a rule may in fact harm the diffusion of new ideas in research environments, and that strict liability is necessary to ensure the patent holder’s incentives. On the other end of the spectrum, some argue that patent law ought to include an “independent invention” defense, under which no liability would attach to making, using, or selling a patented technology if the defendant has independently re-created the patented technology. Commentators who propose this rule argue that strict liability for those who independently invent technology impedes research and development, and leads to higher patent litigation costs. Some scholars, such as Chiang,¹¹ and Blair and Cotter,¹² fall somewhere in the middle of these two poles; it is on their work that this present Article builds.¹³

Assuming the primary justification for patent rights is utilitarian, this Article provides a theoretical economic analysis of accidental patent infringement.¹⁴ Patent scholars have already argued that transaction costs prevent technology users and patentees from *ex ante* bargaining in cases of patent accidents, and that these cases should be governed by a liability rule rather than a property rule.¹⁵ By asking what *type* of liability rule is most appropriate (strict liability or negligence), this Article extends that analysis one step further. Following models developed in the economics of accidents literature,¹⁶ the Article determines which liability rule will reduce the total cost society spends on accidental patent infringement. The Article concludes that a negligence rule best fulfils this goal. Under a strict liability rule, technology users will adopt reasonable care to avoid accidentally incurring liability, but the patentee’s incentives to avoid such accidents (e.g. through providing appropriate notice of their rights) is less than optimal. By contrast, a negligence rule is preferable because it creates incentives for *both* technology users and patentees to adopt reasonable, cost-justified, care to avoid accidents. As a result, the number of patent accidents is reduced, saving society’s resources. More difficult is the question: Which version of a negligence rule will best achieve this goal? While both a simple negligence rule and a contributory negligence rule could feasibly improve social welfare, the Article presents various reasons for preferring a simple negligence rule.¹⁷

⁸ JAMES BESSEN & MICHAEL J. MEURER, *PATENT FAILURE: HOW JUDGES, BUREAUCRATS, AND LAWYERS PUT INNOVATORS AT RISK* 47 (2009).

⁹ Christopher A. Cotriopia & Mark A. Lemley, *Copying in Patent Law*, 87 N.C. L. REV. 1421 (2009).

¹⁰ See *infra* Part II.C.

¹¹ Tun-Jen Chiang, *The Reciprocity of Search*, 66 VAND. L. REV. 1 (2015).

¹² Roger D. Blair & Thomas F. Cotter, *Strict Liability and its Alternatives in Patent Law*, 17 BERKELEY TECH. L. J. 799 (2002).

¹³ See also Oskar Liivak, *Negligent Innovation* (forthcoming).

¹⁴ See *infra* Part III.

¹⁵ Mark A. Lemley, & Philip J. Weiser, *Should Property or Liability Rules Govern Information?* 85 TEX. L. REV. 783 (2007) (following the theoretical framework in Guido Calabresi & Douglas Melamed, *Property Rules, Liability Rules and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089 (1972)). BJ Ard has further argued that property law adopts less property rules than IP lawyers commonly appreciate and that IP should likewise shift to a more liability rule regime. See BJ Ard, *More Property Rules than Property: Revisiting the Right to Exclude in IP*, 68 EMORY L.J. 685 (2019).

¹⁶ See *infra* Part III.

¹⁷ The article does also find, however, the case for negligence in patent law is weaker than in copyright law, due to the existence of mandatory registration in the former but not the latter. See Oren Bracha & Patrick R. Goold, *Copyright Accidents*, 96 B.U. L. REV. 1025 (2016).

To implement such a liability rule, the Article recommends that patent law adopt a “patent negligence” defense.¹⁸ In accident cases, a user ought to avoid liability by proving that she adopted all reasonable care to prevent any accidental patent infringement. Reasonable care may include performing a diligent search of the patent register, inspecting relevant products for patent information, or reviewing the patent portfolios of competitor companies, for example. Implementing such a reform would involve a modest change to judicial practice. Indeed, United Kingdom courts already adopt a “quasi-negligence” rule by denying damages in cases where the defendants did not know of the patent and had no “reasonable grounds” for supposing such a patent existed.¹⁹ In such cases, courts should also use their equitable discretion to deny injunctive relief. In the U.S., under Section 287 of the Patent Act, courts deny damages in cases where the patentee has failed to appropriately mark patented products.²⁰ As will be seen, this current rule imperfectly approximates a strict liability rule accompanied by a contributory negligence defense.²¹ However, rather than focus on the patentee’s level of care, this Article recommends instead that courts focus on the user’s level of care, and deny damages and injunctions when the technology user has taken all reasonable measures to avoid the infringement occurring. This modification is not only well within the judiciary’s authority but would also provide a satisfactory middle-ground between proposals to retain the strict liability standard and proposals to adopt an independent invention defense.

Adopting such a modification has the potential to alleviate many problems in the contemporary patent system.²² In particular, the proposal would help curb abusive behavior of non-practicing entities (or patent “trolls”). Currently, non-practicing entities can prey on the inadvertent infringer: by sending a cease and desist letter, the troll can threaten to shut down small businesses who accidentally infringe the patent.²³ The patent negligence defense, by contrast, would provide a powerful tool for small businesses in fighting patent troll behavior. Businesses will be able insulate themselves from litigation claims from trolls by taking steps that a reasonable company would in order to prevent any accidental infringement; leaving only those who behave negligently to fight such claims in court. Furthermore, a negligence rule would provide patentees with incentives to write clearer patent claims, and thus help address the contemporary concern that the patent system encourages patentees to strategically word claims in ambiguous ways to receive expanded protection.

At this point, some may object: Will eliminating strict liability in accident cases depress incentives for innovation, thus harming society in the future? To which the Article responds: adopting a negligence rule may in some instances cause economic harm to the patentee, but society as a whole will benefit. In 1970, Guido Calabresi famously demonstrated that the optimal level of personal injury accidents in tort law was not, contrary to public opinion, zero.²⁴ Road traffic accidents, in particular, cause severe harm to individuals and broader society. However, adopting measures to prevent those accidents is also costly. In many cases, the cost of the measures required to prevent accidents would be greater than the expected harm caused by the accidents themselves.²⁵ As a result, society makes a choice to tolerate some road traffic accidents because it is better for society as a whole. Our goal is not to eliminate all accidents, but instead encourage parties to invest reasonable, cost-justified, levels of resources into accident-avoidance.²⁶ The same is true of patent infringement today. Accidental infringement of patent rights harms the patentee and in turn future society. However, the measures required to prevent accidental infringement can at times be onerous. In some cases, where the chances of an accident

¹⁸ See *Infra* Part IV.B.

¹⁹ See *Infra* Part IV.A.

²⁰ 35 U.S.C. §287.

²¹ See *Infra* Part IV.A.

²² *Id.*

²³ Reitzig et al, *On Sharks, Trolls, and their Patent Prey – Unrealistic damage awards for firms’ strategies of “being infringed”* 36 RESEARCH POLICY 134 (2007) (“the even greater concern of today’s leading R&D multilaterals of potentially overlooking these (often small) inventors’ patents and being caught in the trap of inadvertent infringement.”)

²⁴ GUIDO CALABRESI, *THE COST OF ACCIDENTS* 17-24 (1970).

²⁵ *Id.*

²⁶ *Id.*

are slim but the costs of avoidance are high, society would be economically better off by simply letting the accident happen, rather than investing inefficiently in avoidance mechanisms. As explored in this Article, a negligence rule achieves this delicate balancing goal.

The Article continues in three Parts. Part II defines accidental infringement of patents and offers a number of illustrations. This Part explains in more detail the causes of such accidental infringements and summarizes the literature on the optimal liability rule in patent law. Part III applies economic theory of accidents to the issue of patent accidents. The analysis reveals the case for some version of a negligence liability rule. Part IV discusses how best to implement a negligence rule and applies the suggested rule to demonstrate how such a law would solve a number of contemporary patent problems. Due to space considerations, Part IV provides reform recommendations in relation to the U.S. and U.K. law only, with the expectation that lawyers in other jurisdictions will translate these recommendations into their own domestic laws. Part V briefly concludes.

II. Patent Accidents

Anglo-American patent law holds all infringers strictly liable.²⁷ Since the 19th century, courts have imposed liability upon anyone who makes, uses, or sells a patented invention, regardless of whether the defendant's infringement was committed intentionally, negligently, or entirely innocently.²⁸ This stands in contrast to many areas of civil law where a defendant is only accountable for unintentional injuries if she failed to take reasonable care.²⁹ Yet, as this Part demonstrates, accidental infringement of patents is all too common. Section A describes accidental infringement of patents in greater detail. Section B discusses some of the main causes of patent accidents. Section C reviews the academic literature debating whether patent liability ought to be imposed strictly or whether some form of a fault standard should be introduced.

A. The Anatomy of Patent Accidents

Broadly speaking, patent infringement can be divided into two types: intentional and accidental. For the purposes of this Article, patent infringement is "intentional" when, prior to the infringement, the defendant was aware that her planned course of action would involve patent infringement but nevertheless engaged in such conduct; for example, if A owns a patent on a new type of mousetrap, and B knowingly sells copies of the mousetrap in order to undercut A in the market.³⁰ Like all forms of intentional tort, determining whether the wrongdoing is intentional

²⁷ For an alternative interpretation see Saurabh Vishnubhakat, *An Intentional Tort Theory of Patents*, 68 FLA. L. REV. 572 (2016) (arguing that patent infringement requires intentional conduct). Cf. Patrick R. Goold, *Intent in Patent Infringement*, 68 FLA. L. REV. F 72 (2017) (arguing that intentional conduct, in both trespass and patent infringement, is not a fault standard). For a related discussion of "objective" fault standards in the area of indirect patent infringement, see Jason A. Rantanen, *An Objective View of Fault in Patent Infringement*, 60 AM. U. L. REV. 1575 (2011).

²⁸ *Hogg v. Emerson*, 52 U.S. 587, 607-08 (1850) ("The intent not to infringe...never exonerates...from all damage for the actual injury or encroachment, though it may mitigate them."); ALBERT H. WALKER, TEXT-BOOK OF THE PATENT LAWS OF THE UNITED STATES OF AMERICA §337, AT 292 (1883) ("To constitute an infringement of a patent, it is not necessary that the infringer should have known of the existence of the patent at the time he infringed it; or, knowing of its existence, it is not necessary that he should have known his doings to constitute an infringement."). See generally Lynda J. Oswald, *The Strict Liability of Direct Patent Infringement*, 19 VA. J. ENT. & TECH L. 993, 999-1005 (2017).

²⁹ Goldberg & Zipursky, *supra* note 6.

³⁰ The concept of "intent" in patent law, as in law and philosophy generally, is debated. Peter Cane describes the concept of intent as being used "loosely" in tort law, sometimes used to refer to voluntariness, sometimes used to refer to describe motive, see Peter Cane, *Mens Rea in Tort Law*, 20 OX. J. LEGAL STUD. 533, 555 (2000). Nevertheless, the use of "intent" in this article is relatively definite. As used here, the term intent is used synonymously with the use of "willfulness" when assessing patent damages, see generally Matthew D. Powers, *The Evolution and Impact of the Doctrine of Wilful Patent Infringement*, 51 SYRACUSE L. REV. 53 (2001). Thus, intentional patent infringement, as used here, involves some element of *mens rea* in the literal sense of a guilty or blameworthy mental state. As a result, simply performing some conduct deliberately which later turns out to be a patent infringement, but without awareness of the wrongfulness of the conduct at the time of acting, is not regarded as intentional here (and accordingly this article's use of intent is not to be confused with that in Vishnubhakat, *supra* note 27). However, this Article is not a work of conceptual analysis, and I do not claim this is the only or in some sense "right" understanding of intent in patent law. The intentional-accidental divide the article draws is used

requires, in theory, an understanding of the defendant's subjective state of mind.³¹ However, as it is difficult to accurately discern the content of a defendant's mental state, in common judicial practice, intent is typically inferred from more objective factors which serve as suitable proxies.³² Courts routinely find patent infringement was intended by examining the probabilistic relationship between the defendant's conduct and the likelihood of infringement: if prior to commencing the conduct, there was a near certainty that such conduct would involve a patent infringement, courts are likely to find patent infringement was intended.³³

Equally, however, patent infringement may be accidental. Frequently in social life, individuals engage in activities which are overall beneficial for society, but which, as a by-product, pose a risk of harm to others around us. At the time the individual engages in the relevant conduct, it is far from certain that the conduct will harm someone else, although it is surely possible. Sometimes that risk materializes into a reality and causes harm to others, even though that is not our desire or intention.³⁴ A classic example is driving automobiles: on balance this activity is beneficial, although it does impose risk of harm on others. Sometimes those risks materialize and individuals are injured, although that was an outcome that no one wished to occur. The same situation occurs frequently in patent law. The process of innovation is socially beneficial, but it comes with risks attached: every time an inventor creates or commercializes a product or process, there is a *risk* that doing so might infringe the patent rights of an earlier inventor. As we shall see in the following examples, sometimes that risk materializes and patent infringements occur, although that was clearly not the desire of any party. Given the choice, both parties would have tried to avoid this unfortunate outcome. These cases in turn pose an important and thorny policy question: who should bear the cost of the accident: the innocent patentee? Or the innocent user who did not wish for this outcome to happen? Should the harm lie where it falls? Or ought we use the law to shift the responsibility to the user?

Accidental infringement takes a number of forms. These can be grouped into three broad categories. The most basic form of accidental infringement occurs when the user of the patented invention is aware that he or she is using some form of technology, but is unaware of the existence of a patent. Perhaps the most discussed example of this occurring is the *NTP v RIM* case, described in the introduction.³⁵ In this case, RIM was engaged in a beneficial activity: inventing new types of pagers and cellphones that allowed individuals to receive emails wirelessly.³⁶ When they started this activity, RIM was, or at the very least ought to have been, aware that such technical activity could possibly infringe the patents of a prior inventor. Ultimately, this risk materialized and a patent infringement did result. However, this was clearly not RIM's intention; quite the opposite in fact.³⁷ RIM did not desire to commit a patent infringement, and if it was reasonably certain to them that their conduct would have amounted to a patent infringement, they likely would have avoided such infringement by licensing the technology from NTP. However, such ex ante bargaining was impossible due lack of accurate ownership information available to RIM.

primarily to define the boundaries of a class of accidental infringement cases which, as we shall see, requires a separate consideration if the law is to reach an efficient allocation of resources.

³¹ See Cane, *supra* note 30, at 534 (describing the core of intent as involving some element of "choice" which is necessarily subjective).

³² Famously, in legal literature, this point was argued in OLIVER WENDELL HOLMES JR., *THE COMMON LAW* 27 (1881). Albeit, Holmes' may well have been arguing that the law never truly imposes liability depending on subjective mental states, but in fact 'really' imposes external and objective standards of conduct. This idea has continued through many economists understanding of tort law to today, see RICHARD POSNER & WILLIAM M. LANDES, *THE ECONOMIC STRUCTURE OF TORT LAW* 149-159.

³³ See *Halo Electronics, Inc. v. Pulse Electronics, Inc.* 126 S.Ct. 1923, 1933 (2016) (describing culpability in tort law as "generally measured against the knowledge of the actor at the time of the challenged conduct").

³⁴ STEVEN SHAVELL, *ECONOMIC ANALYSIS OF ACCIDENT LAW* 1 (1987) ("[B]y 'accidents' I mean harmful outcomes that neither injurers nor victims wished to occur- although either might have affected the likelihood or severity of the outcomes."). Following this definition provided by Shavell, both negligent and non-negligent unintentional wrongs is described in this article as accidental. This may differ from some ordinary uses of the term 'accident' which, for some, may refer only to non-negligent unintentional wrongs. This Article prefers to follow the more specific definition of accident found in the economic literature as opposed to the ordinary language interpretation of the term.

³⁵ *Supra* notes 1-6.

³⁶ *NTP, Inc. v. Research in Motion, Ltd.* 270 F. Supp. 2d 751 (D. Va. 2003).

³⁷ *Id.* at 755 (noting that RIM invented the technology before awareness of NTP's patents).

This resulted in RIM not only making and selling an infringing product, but investing substantial and irretrievable resources into a telecommunications network on which the phones would operate.³⁸

Similar problems arise when the technology user is the end consumer. At the start of twentieth century, patent attorney and inventor George Selden owned a US patent for an “improved road engine” powered by a “liquid-hydrocarbon engine of the compression type.”³⁹ Selden claimed that Ford’s Model T automobile infringed the patent.⁴⁰ While Selden sued Ford, he also threatened the consumers who bought the Model T. Selden advertised that anyone who bought a Model T would also “buy a lawsuit.”⁴¹ Many consumers were likely unaware that by using the Model T, they were “using” technology allegedly subject to a patent, and thus possibly themselves infringing the patent. From their perspective, they were merely engaged in a socially beneficial activity – driving – and were largely unaware that this doing so came with a risk of patent infringement. Ironically, Selden’s threat to sue consumers for using the Model T helpfully limited the risk of such accidental infringements of the patent occurring!

The problem of suing unwary consumers continues today.⁴² Consider for example, the case of the Innovatio lawsuits.⁴³ Innovatio acquired patent rights to certain wireless Internet technologies from Broadcom.⁴⁴ But rather than sue the manufacturers of wireless devices such as routers, like Motorola and Cisco, Innovatio instead sued consumers for buying and using the devices.⁴⁵ Innovatio then sent more than 8000 infringement letters to, and initiated 23 lawsuits against, small businesses that had bought the wireless devices and were using them, for example, to provide internet to their consumers.⁴⁶ Restaurants, cafes, hotels, bakeries, etc. were alleged to be “using” the patented technology and thus infringing their rights.⁴⁷ Much like the purchasers of the Model T, most, if not all, the consumers Innovatio threatened were completely unaware of the existence of a patent on the technology they used.

A variation on this form of accidental infringement occurs when the user of the technology is aware of the patent, but is unaware of a relevant patent claim. A famous example of such a situation is the *Rambus v Infineon* case.⁴⁸ Rambus developed and patented computer memory technology used in semiconductor memory devices.⁴⁹ Like NTP, Rambus was a patent assertion entity, whose primary business was the licensing of the patented technology.⁵⁰ In 1990, Rambus applied to the USPTO for a patent over its “Dynamic Random Access Memory” technology.⁵¹ In 1992, Rambus joined the “Joint Electronic Devices Engineering Council” (JEDEC): a standard setting organization that developed standards for semiconductor technologies.⁵² JEDEC had a written patent policy encouraging the adoption of standards free of patented items or processes. Furthermore, the policy also required members to disclose patents and patent applications “related to” the standardization of the work of the Council. In 1993, Rambus disclosed their patent to the

³⁸ See Research in Motion, History, available at

http://www.blackberry.com/select/get_the_facts/pdfs/rim/rim_history.pdf (RIM had signed wireless handheld supply contracts with American Mobile, IBM, and Rogers Cantel (now AT&T)).

³⁹ George B. Selden, U.S. Patent 549,160, 1895 available

<https://patentimages.storage.googleapis.com/5f/45/7f/147a3b78f67eee/US549160.pdf>.

⁴⁰ JAMES J. FLINK, THE AUTOMOBILE AGE 53 (1990).

⁴¹ *Id.* Ford subsequently countered by offering to bond his customers against any patent infringement suit.

⁴² See generally Gaia Bernstein, *The Rise of the End User in Patent Litigation*, 55 B.C.L. REV. 1443 (2014).

Colleen Chien & Edward Reines, *Why Technology Customers Are Being Sued En Masse for Patent Infringement & What Can Be Done*, 49 WAKE FOREST L. REV. 235 (2014). See also, Daniel Nazer, *Actually, Mr. Waxman, Consumers are Sued For Patent Infringement All the Time*, ELECTRONIC FRONTIER FOUNDATION (April 30, 2014), <https://www.eff.org/deeplinks/2014/04/actually-mr-waxman-consumers-are-sued-patent-infringement-all-time>.

⁴³ *In re Innovatio IP Ventures, LLC Patent Litig.*, 921 F. Supp 2d 903, 906 (N.D.Ill 2013).

⁴⁴ *Id.* at 907.

⁴⁵ *Id.*

⁴⁶ *Id.*

⁴⁷ *Id.*

⁴⁸ *Rambus, Inc. v Infineon Techs. AG*, 318 F. 3d 1081 (Fed. Cir. 2003), *cert denied*, 124 S.Ct. 227 (2003).

⁴⁹ *Id.* at 1084.

⁵⁰ *Id.*

⁵¹ *Id.*

⁵² *Id.* at 1085.

group.⁵³ While Rambus was a member, JEDEC adopted a standard for synchronous dynamic random access memory to be used by semiconductor manufacturers.⁵⁴ Semiconductor manufacturers then began to manufacture chips using SDRAM technology.⁵⁵ In 1995, Rambus withdrew from JEDEC and filed a number of “continuations” on the original patent (continuations allow the patent holder to modify or add additional claims to the patent at a later date in order to broaden its scope).⁵⁶ These continuations ripened into issued patents between 1997 and 1999. Rambus then sued Infineon, a manufacturer of semiconductor memory devices (including SDRAM), and a member of JEDEC, for infringement of the recently issued patents. While antitrust and fraud actions were started against Rambus, the patent was successfully enforced against Infineon, despite their lack of knowledge of the patent. More broadly, the story highlights how strategically hiding claims, particularly through the use of continuations, can contribute to patent accidents.⁵⁷

The second form of accidental infringement occurs when the defendant is aware that she is using technology that is subject to a patent, but believes that she is operating outside the patent’s scope. A classic example of this is the *Polaroid v Kodak* case.⁵⁸ Polaroid had long dominated the instant camera market, until Kodak decided to enter the sector in the 1970s. Kodak was aware that Polaroid owned several patents on instant camera technology. Accordingly they were aware that inventing their own instant camera came with a substantial risk of patent infringement. To reduce this risk, Kodak hired a top patent lawyer to work with their technical staff.⁵⁹ The patent lawyer gave advice about design choices to avoid infringement.⁶⁰ At the end of the process, Kodak produced a camera that worked in a way entirely in reverse of the Polaroid product.⁶¹ Nevertheless, Polaroid sued Kodak and received significant damages.⁶² The judge praised Kodak for taking such care to avoid infringement, but nevertheless found them liable.⁶³ These types of accidental infringement may be called “boundary accidents” rather than “ownership accidents,” as the defendant is aware of who owns the technology, but is simply unaware of the scope of the patent right. In this Article, we shall put “boundary accidents” to one side, and thus avoid assessing the merits of “designing around patents” for the time being. The focus in this Article is more firmly on ownership accidents.

Of course, the boundaries between ownership and boundary accidents blur in some cases, as illustrated by the E-Data controversy. In the 1980s, Charles Freeny invented a kiosk that was used by consumers in retail stores to create digital audio tapes.⁶⁴ However, the patent issued on the technology was vaguely and amorphously written.⁶⁵ The US patent provided the patent holder with the exclusive rights to a “system for reproducing information in material objects at a point

⁵³ Namely U.S. Patent No. 5,243,703, a divisional of the patent application Serial No 07/510,898.

⁵⁴ *Id.* at 1085.

⁵⁵ *Id.*

⁵⁶ *Id.* at 1084. Perhaps even more unsettling, Rambus learned information through their participation in the standard setting process that allowed them to write claims that covered the standard. See Bessen and Meurer, *supra* note 8, at 62.

⁵⁷ Many proposals have been made to end such abuse, see generally Mark A. Lemley & Kimberly A. Moore, *Ending Abuse of Patent Continuations*, 84 BU. L. REV. 63 (2004). But yet the problem of hidden claims remains. Particularly troublesome are cases where the patentee adds or modifies claims (to the extent their initial written description allows) to anticipate new products produced by competitors, see *id.* at 74-76.

⁵⁸ *Polaroid Corp v. Eastman Kodak Co.* 789 F.2d 1556 (Fed. Cir. 1986). See also RONALD K. FIERSTEIN, A TRIUMPH OF GENIUS: EDWIN LAND, POLAROID, AND THE KODAK PATENT WAR Chapter 9-12 (2015).

⁵⁹ *Polaroid Corp v. Eastman Kodak Co.* 1990 WL 324105, 76 (D. Mass. 1990) (“During the lengthy and detailed patent clearance process he performed for Kodak, Mr. Carr considered over 250 Polaroid and non-Polaroid patents and rendered 67 written and countless oral opinions on both the film and camera patents.”).

⁶⁰ *Id.*

⁶¹ *Id.* at 76-79 (comparing products).

⁶² *Id.*

⁶³ *Polaroid Corp v. Eastman Kodak Co.* 1990 WL 324105, 79 (D. Mass. 1990) (Judge Mazzone stating that the record “shows a patent clearance process that could serve as a model for what the law requires.”).

⁶⁴ Bessen & Meurer, *supra* note 8, at 8-10.

⁶⁵ *Id.* See also Seth Shulman, *IP’s Bleak House*, MIT TECHNOLOGY REVIEW (2001)

<https://www.technologyreview.com/s/400914/ips-bleak-house> (citing the Freeny patent as an example of an “absurdly broad patent” that is “fuzzy” and “likely to stymie innovation”).

of sale location.”⁶⁶ In the early 2000s, the patent holding company E-Data argued that the scope of this patent’s monopoly covered a wide range of e-commerce.⁶⁷ Companies such as Microsoft and IBM were, allegedly, infringing the patent, by selling downloadable music and software over the Internet.⁶⁸ E-Data sent out 75,000 letters to websites, offering licenses and in return promising not to bring legal action.⁶⁹ It is certain that a large amount of these companies were unaware of the Freeny patent (and had committed an “ownership accident”). The boundaries of the patent were so vaguely demarcated, that companies such as Microsoft and IBM were not aware that the technology they had adopted was subject to a patent right. These types of accidents accordingly fall within the scope of this Article’s concern.

Lastly, in some cases the user is completely unaware he or she is using the underlying technology. A famous, albeit controversial, example of this concerns the Monsanto Roundup Ready seeds. In 2005, Percy Schmeiser, a Canadian farmer, was subject to a Canadian Supreme Court case.⁷⁰ Monsanto found Canola on Schmeiser’s farm which had been grown from their patented Roundup Ready Canola seeds.⁷¹ Schmeiser maintained that he had grown this genetically modified crop accidentally.⁷² Schmeiser argued that other farmers in the area were growing Roundup Ready Canola, and that the wind and insects had moved seeds from their crops onto his land, causing him to inadvertently grow the crop.⁷³ While this account of events was disputed, the issue it presents has long concerned farmers. In the US, the Organic Seeds Growers and Trade Association sued Monsanto alleging that preventing this form of “contamination” of their organic crops required significant expenditure on their part (in the form of erecting hedges and wind barriers, special and temporal crop rotation, etc.).⁷⁴ Both the Canadian and US Supreme Court have declined to determine the patent liability of those who accidentally grow patented seeds.⁷⁵

B. The Causes of Patent Accidents

There are many causes of the patent accident problem, most of which are well documented.⁷⁶ In part, the problem is somewhat unavoidable due to the innate difficulties in assigning property rights in intangibles. The boundaries of patent rights will always be elusive simply because of the fundamental difficulties of describing an invention in words. This fundamental problem contributes significantly to cases such as *Kodak*.⁷⁷ However, beyond these difficulties, there are further causes which are less intractable; causes which, with appropriate policy responses, could be counteracted.

One notable cause is the presence of “patent thickets.” Some industry sectors contain “dense web[s] of overlapping intellectual property rights” that companies must spend countless

⁶⁶ US Patent 4,528,643.

⁶⁷ Bessen & Meurer, *supra* note 8, at 8-10.

⁶⁸ *Id.*

⁶⁹ *Id.*

⁷⁰ *Monsanto Canada Inc. v. Schmeiser* [2004] 1 S.C.R. 902. Controversial because after the seeds had supposedly “accidentally” blown onto Schmeiser’s land, Schmeiser replanted the seeds in a way that was arguably an intentional infringement of the patent. This case has received much academic commentary. See e.g. Jessica Lynd, *Gone With the Wind: Why Even Utility Patents Cannot Fence In Self-Replicating Technologies*, 62 AM. U. L. REV. 663 (2013).

⁷¹ *Monsanto Canada Inc. v. Schmeiser* [2004] 1 S.C.R. 902

⁷² *Id.*

⁷³ *Id.*

⁷⁴ *Organic Seeds Growers and Trade Ass’n v. Monsanto Co.* 851 F.Supp. 544, 548 (2012) (“Seed businesses and farmers may, at some expense, test their seeds and crops to ensure that no contamination has occurred, and non-transgenic farmers may establish buffer zones between themselves and farmers using transgenic seed in order to reduce the risk of cross-transmission.”)

⁷⁵ *Monsanto Canada Inc. v. Schmeiser* [2004] 1 S.C.R. 902 (“In reaching this conclusion, we emphasize from the outset that we are not concerned here with the innocent discovery by farmers of “blow-by” patented plants on their land or in their cultivated fields.”); *Bowman v. Monsanto*, 133 S. Ct. 1761, 1769 (2013) (declining to rule on the issue of patent exhaustion in cases of technologies which replicate outside direct human control).

⁷⁶ See generally Bessen & Meurer, *supra* note 8, at 38-45.

⁷⁷ *Polaroid Corp v. Eastman Kodak Co.* 789 F.2d 1556 (Fed. Cir. 1986).

hours scouring in order to commercialize a new product.⁷⁸ A classic example of this problem is the smartphone industry. One estimate suggests that 250,000 active patents impact the smartphone industry today.⁷⁹ Incorporating Bluetooth 3.0 technology into a phone requires the producer to locate and license over 30,000 patents alone.⁸⁰ Finding all the relevant patents and their owners is for most smartphone producers a Sisyphean task. As a result, some commentators go as far as to say that full patent clearance is simply impossible.⁸¹ Under such circumstances, some accidental infringement is very hard to avoid.⁸² Producing new smartphones is clearly a socially valuable activity, but doing so imposes very obvious risks of accidentally infringing the patent of another company. While there are measures one can take to reduce those risks, e.g. by searching the register, those measures are of dubious efficacy and would involve a very significant investment of resources. Furthermore, the problem is hardly limited to smartphones, but affects “virtually every modern device (e.g. a computer, a car, or a television).”⁸³ In the U.K., the Hargreaves Digital Opportunity: Review of IP and Growth found the emergence of patent thickets were obstructing entry to some key markets and thus impeding innovation.⁸⁴

The second cause of note is the “notice failure” problem.⁸⁵ Ideally, patents on the patent register should give others in society accurate information about the existence and boundaries of the patent. The clearer the description of the claimed invention, the easier it is for producers to avoid patent infringement. However, Bessen and Meurer find the U.S. patent system to be “critically deficient in this regard.”⁸⁶ As the eData and Kodak cases illustrate, patent documents often do not provide sufficient notice to the public of either the scope of patents. As Judge Learned Hand once stated that patent claims “can be such a waste of abstract verbiage” and that it “takes the scholastic ingenuity of a St Thomas with the patience of a yogi to decipher their meaning.”⁸⁷ The result is not only that accidental “boundary” type infringements occur (as in *Kodak*) but also it makes it more difficult for producers to discover whether a technology is owned and by whom (leading to the “ownership” type accidents). As Bessen and Meurer continue to describe, this notice failure plays a “crucial role” in leading to inadvertent infringement which is central to the rising costs of the patent system.⁸⁸

Furthermore, the notice failure problem is not attributable simply to the innate difficulties of demarcating property rights in intangibles, but is, in large measure, a problem of institutional design. As Menell and Meurer demonstrate, the current patent system does not provide patent holders with sufficient incentives to provide the public with adequate notice.⁸⁹ Instead, frequently inventors can “benefit from obfuscating the scope of rights and keeping others in the dark about intellectual property.”⁹⁰ At the root of the problem is an externality based market failure: ownership and boundary information is a public good, when the patentee supplies this

⁷⁸ Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting* (2001) 1 INNOVATION POLICY AND THE ECONOMY 120 (2001).

⁷⁹ See Mike Masnick, *There are 250,000 Active Patents That Impact Smartphones; Representing One in Six Active Patents Today*, TECHDIRT (Oct. 18 2012).

⁸⁰ Even Engstrom, *So How Many Patents Are in A Smart Phone?* ENGINE (Jan. 19, 2017) <https://www.engine.is/news/category/so-how-many-patents-are-in-a-smartphone> (“Consider Bluetooth 3.0 - a technology incorporating the contributions of more than 30,000 patent holders, including 200 universities...”).

⁸¹ See Chiang, *supra* note 11, at 15-17.

⁸² However, some have also questioned how significant the patent thicket problem really is. See Jonathan Barnett, *Are There Really Patent Thickets?* REG. 14 (2016-17) (doubting that patent thickets persist for any significant period of time because the market has incentives to arrange ways to avoid the problems – e.g. patent pools). See also Jonathan Barnett, *Has the Academy Led Patent Law Astray?* 32 BERK TECH L J 1313 (2017).

⁸³ *Id.* at 15.

⁸⁴ Ian Hargreaves, *Digital Opportunity: A Review of Intellectual Property and Growth* 10 (2011). For alternative solutions to the patent thicket issue, see e.g. Miriam Marcowitz-Biton et al, *Recoupment Patents*, N. CAROLINA L. REV. (forthcoming 2019).

⁸⁵ Bessen & Meurer, *supra* note 8 at 147 (“Simply put, notice failure and the resulting inadvertent infringement are central to the failure of patents to provide positive innovation incentives.”); Peter S. Menell & Michael J. Meurer, *Notice Failure and Notice Externalities*, 5 J. LEGAL ANALYSIS 1, 14 (2013).

⁸⁶ Bessen & Meurer, *supra* note 8, at 46.

⁸⁷ *Victor Talking Mach. Co. v. Thomas A. Edison, Inc.* 229 F. 999, 1001 (2d Cir. 1916).

⁸⁸ Bessen & Meurer, *supra* note 8 at 147.

⁸⁹ Menell & Meurer, *supra* note 85, at 1.

⁹⁰ Menell & Meurer, *supra* note 85.

information, he or she benefits others in society but does not benefit from doing so herself.⁹¹ As a result, the patentee faces suboptimal incentives to provide this information to the public.⁹² In fact, the opposite is the case: often the patentee can “benefit from strategically hiding, obfuscating, and distorting such information.”⁹³ For example, in relation to the RIM v. NTP case, the authors highlight how NTP were in a stronger bargaining position after RIM had “unwittingly invested heavily in a potentially infringing wireless email technology.”⁹⁴ As a result, NTP “clearly benefited from its patents not being easily known.”⁹⁵ Rambus provides a similar example of such behavior.

Similarly, by seeking broad and vague claims, the patentee “maximizes the likelihood that the patent can be stretched to reach unforeseen competing technologies” (as illustrated by the eData) case.⁹⁶ A “good” patent drafter will therefore try to construct claims to be ambiguous enough so that they can be read narrowly during the patent examination and broadly during patent litigation. In some cases, this involves cynical obfuscation techniques. Freilich recently demonstrated the problem of “patent clutter.”⁹⁷ An astonishing 25% of claim language in her sample of U.S. patents was not about the patent’s core invention.⁹⁸ While there are many potential reasons why patent holders may choose to “pad” their patent claims with irrelevant language, one clear reason is that doing so makes the patent document harder to read and understand, thus introduces ambiguity that may be exploited in litigation to ensure the broadest scope of protection possible.⁹⁹

C. Literature Review

A number of commentators have questioned the liability rule applying to unintentional patent infringements. Broadly these scholars have proposed three different solutions. The first two solutions are the most fully explored. These are either to maintain the strict liability standard, or alternatively, to adopt an independent invention defense. The last option (the most under-explored of the three) is to adopt some form of negligence rule. This Section outlines these proposals in turn.

1. Strict Liability Proposals

The first option is to maintain the current strict liability rule for one who accidentally makes, uses, or sells a patented product. Writing in 2002, Blair and Cotter compared strict liability rules and negligence rules for governing patent infringement.¹⁰⁰ The authors concluded that strict liability was preferable to negligence liability for administrative cost reasons.¹⁰¹ If patent law adopted a negligence rule, courts would be required to assess whether the defendant behaved reasonably.¹⁰² This would require courts to make a decision about the optimal amount of care the defendant should exercise (e.g. how much time should the patent holder search the register for? would it be reasonable for the patent holder to seek an infringement opinion letter from an attorney or patent office?). As strict liability does not require such a costly judicial analysis, they concluded strict liability was preferable to negligence.

Nevertheless, Blair and Cotter did find that a “modified” strict liability rule, wherein liability was strictly imposed, but damages were eliminated for those who infringed without actual or constructive notice of the patent, was the optimal rule.¹⁰³ In particular, the authors argued that conditioning damages upon constructive notice (namely product marking) would incentivize the

⁹¹ *Id.*

⁹² *Id.*

⁹³ *Id.* at 9.

⁹⁴ *Id.*

⁹⁵ *Id.*

⁹⁶ *Id.* at 33.

⁹⁷ Janet Freilich, *Patent Clutter*, 103 IOWA L. REV. 925 (2018).

⁹⁸ *Id.*

⁹⁹ *Id.* at 961-65.

¹⁰⁰ *Supra* note 12.

¹⁰¹ *Id.* at 821-29.

¹⁰² *Id.*

¹⁰³ *Id.*

patentee to take care to reduce the chances of inadvertent infringement.¹⁰⁴ Furthermore, the authors found that in some instances, placing the entire responsibility to avoid inadvertent infringement upon the technology user could lead to the technology user to take socially excessive care.¹⁰⁵

As a result, although literature routinely cites Blair and Cotter for supporting the strict liability regime, their proposed liability regime is in fact closer to a negligence rule than is commonly perceived. As will be expanded upon in Part IV, the Blair and Cotter proposal is best described as a strict liability rule accompanied by a contributory negligence defense, i.e. the user will be strictly liable for damages unless she can show the patent holder failed to take reasonable care to avoid the infringement by providing adequate notice.¹⁰⁶ As later sections explore more fully, this proposal has many of the same benefits of a more straightforward negligence rule. Nevertheless, the proposal differs from such a rule in the following ways: the contributory negligence standard is defined using a bright line rule (i.e. appropriate marking) rather than a vague standard (i.e. did the patentee take “reasonable care”); and the patentee who is contributorily negligent nevertheless receives injunctive relief.¹⁰⁷

More recently, Robert Merges has partially defended the strict liability rule.¹⁰⁸ Merges focused particularly on whether courts should hold those who do not deliberately copy a patented invention ought to be held strictly liable, or alternatively, whether such defendants should be held not-liable (absent proof of deliberate copying).¹⁰⁹ Merges concludes, tentatively, that such innocent infringers ought to be held liable. Merges asked the question: whether “there is anything to be said for the absolute liability standard?”¹¹⁰ To which, Merges makes a “tentative start in the direction of the current doctrine.”¹¹¹ The strict liability rule was defended for two reasons. First, in many cases, the cost for the patent holder of proving copying would be very high, thus limiting the compensation they receive from their invention.¹¹² Second, the strict liability standard may increase the dissemination of the technology.¹¹³ If an independent invention defense is introduced in patent law, defendant companies would limit their contact with patent holders, and would limit the information its researchers have access to, in order to increase the chances that, should an infringement occur, the independent invention defense would apply.¹¹⁴ By contrast, under strict liability, the defendant’s liability does not depend on their level of knowledge, and thus companies have less incentive to keep their researchers in the dark about existing patents.¹¹⁵

Lastly, some commentators have suggested introducing compulsory licensing regime in cases of accidental patent infringement. For example, Lemley and Weiser argues that in cases where transaction costs significantly reduce the ability of the patentee and the technology user from bargaining for a license, a “liability rule” ought to be implemented, i.e. an obligation to pay damages, rather than a “property rule”, i.e. an obligation to stop using the technology until receiving the owner’s permission.¹¹⁶ This proposal would cover accident cases wherein the technology owner and the patentee often cannot bargain ex ante. What the authors do not question is what *type* of liability rule ought to be in place: strict liability or negligence? This article agrees that a property rule ought to give way to a liability rule. But a compulsory licensing regime, where damages must be paid upon every accidental infringement, is a version of a *strict* liability regime. Part III considers whether the duty to pay damages ought not be so strictly imposed, but instead only awarded where the defendant failed to take reasonable care to prevent the infringement.

¹⁰⁴ *Id.* at 834.

¹⁰⁵ *Id.*

¹⁰⁶ *Infra* Part IV.A.

¹⁰⁷ *Id.*

¹⁰⁸ Robert Merges, *A Few Kind Words for Absolute Infringement in Patent Law*, 31 BERKELEY TECH. L. J. 1 (2016).

¹⁰⁹ *Id.*

¹¹⁰ *Id.* at 10.

¹¹¹ *Id.*

¹¹² *Id.* at 6.

¹¹³ *Id.* at 6-7.

¹¹⁴ *Id.*

¹¹⁵ *Id.*

¹¹⁶ *Supra* note 15. See also Ard, *supra* note 15.

2. Independent Invention Proposals

On the other end of the spectrum, some commentators argue that patent law should adopt an “independent invention” defense, i.e. a defense for making, using or selling patented technology when the user has independently recreated the technology, rather than copying it from an existing technology. In 2002, Maurer and Scotchmer proposed that such a defense would be beneficial for social welfare.¹¹⁷ The authors posited that two positive consequences would occur, should such a defense be introduced. First, the authors found that the threat of entry by independent invention would encourage patent holders to license patented technology more frequently and at lower prices, thus increasing access to the technology.¹¹⁸ In a system with an independent invention defense, it would make financial sense for the patentee to deter market entry by an independent inventor through licensing the technology at a price below the price set in a legal regime without an independent invention defense. The authors argue that while the patentee would receive a lower profit, his licensing revenue would still exceed the amount necessary to cover R&D costs. Second, the authors posit that such a doctrine would limit the amount of investment into patent “races.”¹¹⁹

The common counter-argument to any proposal to adopt an independent invention defense is that such a doctrine would negatively affect inventors’ incentives to create. This was partially a concern raised in the original Maurer and Scotchmer article.¹²⁰ The Maurer-Scotchmer proposals were based on a model of innovation wherein the costs of research and development was relatively low.¹²¹ If this assumption is relaxed, and cases where R&D costs are particularly high (e.g. such as pharmaceutical research where ex ante probability of success of producing a patentable invention are low) then the authors found that an independent invention defense could indeed undercut incentives to invent. To avoid this problem, Maurer and Scotchmer suggest adopting a series of statutory exemptions to the independent invention defense.¹²² But this raises the problem, as stated by Blair and Cotter, that it leads to rent seeking as certain industries lobby to be qualified as an exempted industry.¹²³

Subsequent commentators have debated whether such a doctrine would diminish inventors’ profits too greatly. In 2006, Samson Vermont offered a novel argument in favor of an independent invention defense.¹²⁴ While acknowledging that such a defense would limit patent holder profits, Vermont concluded that the reduction in expected profit is likely to have only a moderate effect on incentives to invent.¹²⁵ Vermont argues that many inventions are created by more than one person in quick succession (and this is particularly true of highly socially valuable inventions, for example, the lightbulb by Edison and Swann, or the telephone by Bell and Gray).¹²⁶ Vermont argues the fact that an invention could be invented by multiple people is evidence that a moderate reduction in profits, such as that which would come from allowing an independent invention defense, is unlikely to harm incentives to create; it is likely that the reduced profits will be enough to motivate at least one inventor to create the invention. However, some commentators are not convinced by this argument. While acknowledging the reasoning, Mark Lemley responds that the “stakes are quite high” and that, if an independent invention defense would significantly reduce the incentives to innovate, then “the potential losses for society are substantial”, and this is particularly relevant in the class of high social utility inventions that Vermont discusses.¹²⁷ Lemley concludes that he is “not yet confident that an independent

¹¹⁷ Stephen M. Maurer & Suzanne Scotchmer, *The Independent Invention Defense in Intellectual Property*, 69 *ECONOMICA* 535 (2000). For another proposal relating to independent inventions, see Oskar Liivak, *Rethinking the Concept of Exclusion in Patent Law* 98 *Georgetown L.J.* 1643 (2010) (explaining and analyzing a “free entry” reform proposal initially put forth by Learned Hand).

¹¹⁸ Maurer & Scotchmer, *supra* note 117, at 535-36.

¹¹⁹ *Id.*

¹²⁰ *Id.* at 543-44.

¹²¹ *Id.*

¹²² *Id.*

¹²³ *Supra* note 12, at 814.

¹²⁴ Samson Vermont, *Independent Invention as a Defense to Patent Infringement*, 105 *MICH. L. REV.* 475 (2006).

¹²⁵ *Id.* at 480.

¹²⁶ *Id.*

¹²⁷ Mark A. Lemley, *Should Patent Law Require Proof of Copying?* 105 *MICH. L. REV.* 1524, 1528 (2007).

invention defense will have no undue effect on incentives.”¹²⁸

Nevertheless, the merits of an independent invention defense largely fall outside the scope of this article’s concern. First, an independent invention defense does more than shield the accidental infringer from liability, but has the ability to protect an intentional infringer as well. Consider for example someone who independently invents a patented technology. After which, she is informed of the patent. Any subsequent selling of the technology would be an intentional infringement. However, the independent invention defense would shield her from liability flowing from subsequent sales performed with knowledge of the patent. Second, an independent invention defense does not necessarily mean the underlying liability rule is not strict. Copyright law adopts an independent creation defense, yet the liability rule in copyright law is routinely described as strict because “copying” is not necessarily understood as requiring deliberate and intentional action.¹²⁹ These two points indicate there may be some divergence between the question of whether an independent invention defense is appropriate, and the question of whether a fault standard is desirable.

Fundamentally, the independent defense question and the fault question are distinct and ought not to be confused. When debating the merits of an independent invention defense, scholars are trying to determine what conduct should fall within the scope of the patent monopoly? Should uses of the good following independent invention fall within the IP owner’s exclusive right or not? The answer to which will depend on a careful balancing of the incentive benefits and access costs of extending the scope of the monopoly. This is different from the question posed when considering strict liability versus negligence. Here the question is: Assuming the defendant has performed some conduct that falls within the scope of the patent monopoly, should the defendant nevertheless be exempted from liability on the grounds that they took reasonable care to prevent such conduct from occurring? Because these questions are different, the paradigm we use to answer these questions is also different. The analytical framework required to answer the fault question is distinct from a simple incentive-access cost analysis. Rather, we assume the incentive-access paradigm has been considered, and that the scope of the patent monopoly is set according to that paradigm, and then move on to a distinct, but equally important, policy question: How can we most cheaply reduce the costs of such infringement occurring? This analytical framework will be applied to our problem in Part III. As a result, the Article focuses squarely on the choice between strict liability and negligence liability for infringements of patent rights, and leaves the question of an independent invention defense for another day.

3. Negligence Proposals

Relatively few commentators have explicitly explored the use of negligence liability in patent law. However, there has been some recent thought in this direction. In 2012, Sterk suggested that property law in general, and intellectual property law in specific, should adopt negligence rules more frequently.¹³⁰ Indeed, Sterk highlighted that, contrary to common wisdom, property law often relies on negligence rules (or “proxies” for negligence rules) in certain circumstances.¹³¹ These rules apply often “where ascertaining the scope of boundaries is costly.”¹³² Sterk cites “reasonable encroachers” as an example: where a defendant inadvertently builds on the land of another after commissioning a survey to determine the precise boundary between the land, courts will often use doctrines such as “relative hardship” to defeat any claim brought on behalf of the property owner.¹³³ Sterk argues that courts recognize that, in such circumstances, the defendant has taken reasonable care to avoid the infringement, and proxy rules are applied to excuse the infringement.¹³⁴ By contrast, if a defendant builds on a neighbor’s land in direct contrast to the survey’s conclusions, courts typically require the defendant to remove the

¹²⁸ *Id.*

¹²⁹ *See, e.g.,* Shapiro, Bernstein & Co. v. H.L. Green Co., 316 F.2d 304, 308 (2d Cir. 1963); Religious Tech. Ctr. v. Netcom On-Line Comm’n Servs., 907 F. Supp. 1361, 1370 (N.D. Cal. 1995).

¹³⁰ Stewart E. Sterk, *Strict Liability and Negligence in Property Theory*, 160 PA. L. REV. 2129 (2012).

¹³¹ *Id.* at 2141-50.

¹³² *Id.* at 2133.

¹³³ *Id.* at 2143.

¹³⁴ *Id.*

encroachment.¹³⁵

Nevertheless, Sterk's article, while presenting a novel and interesting argument, is incomplete in some important respects. Most importantly, the analytical-theoretical framework used to decide whether a negligence rule ought to be imposed could be improved. Sterk accurately highlights how it is costly to discern the existence and scope of IP rights.¹³⁶ But that itself does not explain why a negligence rule, as opposed to a strict liability rule, is appropriate.¹³⁷ There is a justificatory "gap" in the paper. To fill in this gap, we require a more defined and robust normative framework in place before we can answer these questions fully. Part III of this article supplies and applies that analytical-normative framework.

In a similar vein, Tun-Jen Chiang recommends that patent law, in theory, should adopt a "contributory search" defense to infringement actions (akin to a contributory negligence defence).¹³⁸ While patent doctrine typically expects producers to search for patentees, Chiang argues that, in some circumstances, it is in fact easier for patentees to search for producers.¹³⁹ Consider for example, the *Rambus* case discussed earlier.¹⁴⁰ As Rambus was aware of the patent and the potential for infringement, it was easier for Rambus to alert Infineon to the presence of the patent claims than it was for Infineon to discover Rambus's entitlements.¹⁴¹ Likewise, in some industries, such as the smartphone industry, where there are many patentees but relatively few producers, it may also be easier for the patentees to keep track of the use of their proprietary technology than require producers to clear all patents.¹⁴² To reduce the chances of inadvertent infringement, Chiang argues that patent law needs some doctrinal mechanism to encourage the least cost searcher – whether that is patentee or producer – to conduct appropriate searches. The tool for the job is, theoretically, a contributory search (or contributory negligence) defense. Inadvertent infringers ought to be able to avoid liability if they can show that in fact the patentee was best placed to avoid the infringement. By introducing such a defence, companies like Rambus would no longer benefit from hiding their patent claims, and thus the chances of inadvertent infringement would be minimized.

Nevertheless, questions remain post Chiang's article. Like Sterk's article, there is the question of which type of negligence rule is preferable? Why, for example, is a strict liability rule accompanied by a contributory negligence defense preferable when a simple negligence rule (or indeed a comparative negligence rule) would be equally capable of encouraging the producer search? Furthermore, neither Sterk nor Chiang directly address a number of "secondary considerations" which need to be considered before proposing some form of negligence rule. These include, for example, the administrative cost of such a rule and the likelihood of judicial errors. Similarly, Chiang's article is also somewhat limited in scope. The article is focused primarily on encouraging patent holders to search for technology users.¹⁴³ However, there are arguably other ways that the patent holder could prevent accidents, outside of searching for

¹³⁵ *Id.*

¹³⁶ *Id.*

¹³⁷ Sterk's article does make some moves to justify the use of negligence rules by appealing to the concept of information costs. However, information cost theory is more helpful when determining how to define property rights, than on the question of fault. As discussed in the work of Henry Smith, property rights can be delineated using either exclusion or governance strategies, see Henry E. Smith, *Exclusion versus Governance: Two Strategies for Delineating Property Rights*, 31 J. LEGAL. STUD. S453 (2002). The choice of an exclusion strategy or a governance strategy ought to be made by comparing the benefit that more precisely delineated property rights would provide against the cost of acquiring the extra additional information required to delineate such rights. Once property rights are so defined, there is a separate question, discussed in this article, i.e. whether all infringements of those rights should result in liability, or only those infringements which result from carelessness. As Part III elaborates upon, this decision must be made by examining the effects of the possible liability rules on the parties' incentives to invest efficient levels of resources in accident avoidance.

¹³⁸ *Supra* note 11. Although practical difficulties in doing so leads Chiang to ultimately adopt a more modest proposal of amending the current damages framework, *id.* at 43-50.

¹³⁹ *Id.*

¹⁴⁰ *Rambus, Inc. v Infineon Techs. AG*, 318 F.3d 1081 (Fed. Cir. 2003), *cert denied*, 124 S.Ct. 227 (2003).

¹⁴¹ *Id.* at 12-13.

¹⁴² *Id.* at 4 ("if there are a small number of well-known producers (e.g. a few large companies that dominate an industry), while there are thousands of small and unknown patentees, then it would be more efficient to have patentees look for producers, rather than have producers look for patentees.")

¹⁴³ *Id.*

technology users, such as by fixing appropriate notice to the work or by writing clearer patent claims. Ideally, the question of strict liability versus negligence should consider whether the chosen liability rule encourages the patent holder to take these other important precautionary measures as well.¹⁴⁴ Lastly, as will be elaborated upon in Part III, this Article employs a slightly different, but arguably more standard, set of theoretical models to analyze the problem.¹⁴⁵

What is needed at this stage is a more analytical approach to the question of strict liability versus negligence in patent law. While Sterk's and Chiang's research provides important insights, this present Article builds on their work by providing a less synthetic approach (that focuses on highlighting similarities with tort law), and a more analytical dissection of the costs and benefits associated with a negligence rule in patent law. It is to that analysis that the Article now turns.

III. The Case for Negligence

The primary justification for patent rights is utilitarian: patent rights are desirable to the extent they maximize the common good.¹⁴⁶ In this Article, it is assumed that an efficient use of resources will maximize society's welfare and thus contribute to the common good. But what liability rule will result in an efficient use of resources? Using economic models of accidents from the law of torts, Section A begins by fleshing out the concept of welfare maximization in this context. Contrary to common belief, society's welfare will not be best served by attempting to stop all accidental infringements. Instead, the goal for policymakers should be to encourage parties to take *cost-justified* measures to avoid accidental infringement. Section B and C compare various liability rules in relation to this goal. Section D concludes that some form of a negligence liability rule is optimal because a negligence rule incentivizes cost-justified accident prevention from all relevant parties. This Part finds that the best liability rule is either a simple negligence rule or a strict liability rule accompanied by a contributory negligence defense, and explains some further reasons for preferring a simple negligence rule.

A. The Social Cost of Patent Accidents

Accidental infringement of patents harms society. However, spending time and resources on preventing accidental infringement is also harmful. Therefore, maximizing the common good requires members of society to minimize the aggregate harm (hereinafter "cost") flowing from these two sources. This Section explains each of these points in turn.

1. Accident Costs

Inventions are almost universally beneficial for society but, due to a public-goods market failure, are likely to be under-produced in a competitive market.¹⁴⁷ Patent rights redress this issue by providing a time-limited monopoly right. During the patent term, anyone who wishes to use the invention must negotiate a license with the patent holder, and pay the inventor a supra-competitive price. The ability to charge a supra-competitive price enables the inventor to recover the fixed research and development costs of the invention, and thus encourages inventors to supply inventions at a more socially optimal rate.

Accidental infringement of patents hampers this goal. In accident cases, it is impossible for the technology user to negotiate a license *ex ante* because, at this point in time, it is not clear whether the technology is patented or who the patent holder is. As a result, accidental infringement of patents occurs, resulting in the patentee's invention being used without the patentee receiving compensation. This lost revenue represents a private cost to the patentee. More importantly, the lost revenue of the patentee may reduce innovation incentives for future inventors, resulting in a social cost to the wider public at a later time. For the time being, we shall

¹⁴⁴ See also Oskar Liivak, *Negligent Innovation*, (forthcoming) (similarly arguing that accidental patent infringement is a bilateral accident wherein incentives need to be set for both parties to take adequate precautionary measures).

¹⁴⁵ In particular, this Article departs from the 'Least Cost Avoider' model. See *infra* note 156.

¹⁴⁶ See e.g. Letter from Thomas Jefferson to Isaac McPherson (Aug. 13, 1813) in *The Writings of Thomas Jefferson* 326, 334-35 (Andrew A. Lipscomb ed. 1903) (society ought only suffer the "embarrassment of an exclusive patent" if it "benefits society") cited in *Graham v. John Deere Co.*, 383 U.S. 1, 7-11 (1966).

¹⁴⁷ See generally WILLIAM M. LANDES & RICHARD A. POSNER, *THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY LAW* 294-334 (2003).

assume that the private cost the patentee suffers in lost license fees is a decent proxy for the lost future social welfare resulting from decreased innovation incentives.

Let us call the private cost imposed on the patentee the *accident costs* or A , and further let us assume that if the accident costs are, e.g. \$100, that this will reduce incentives for future innovation also by \$100. Prior to the accident occurring, the technology user cannot say with certainty what the accident costs will be, but she can roughly calculate the *expected accident Costs* or pA by multiplying the probability of an accident occurring (p) by the amount of private harm (A) that such an accident would cause if it were to occur.

2. Precaution Costs

The technology user can take steps to prevent such accidental infringement occurring. Assuming the parties are operating in a country which has publicly accessible register of all granted patents, someone engaging in a technical activity can search the register to determine whether her activity would infringe a valid patent. Such users can also inspect any relevant physical products to see whether they are labeled with patent information (e.g. a patent number). Furthermore, users can keep up to date with the patent portfolios of competitors and perform other searches (such as simple Google searches). Let us call this *user care* or C^u .

Equally, the patent holder can also take care to prevent such accidents. Most importantly, the patent holder can mark any products she produces with the relevant patent information¹⁴⁸ (including products which are not themselves patented, but which are produced by a patented method¹⁴⁹). This traditionally has required physical marking of patented products, but since the America Invents Acts, the patentee's ability to provide notice through marking has substantially increased via the use of "virtual marking" i.e. affixing onto articles the word "patent" (or "pat") followed by a URL address directing the user to a website containing patented information.¹⁵⁰ Likewise, patent holders can maintain websites providing "standardized information about all intellectual property rights associated with protected products"¹⁵¹ and update those websites as new IPRs are acquired. The patent holder can also write clearer patent claims, thus increasing the chances that a user searching the registry will find the relevant patent information. Or, as argued by Chiang, patent holders can also search for users. In some markets where there are many patentees but only a few users of the technology (e.g. the semi-conductor industry where there are many patentees but only a handful of producers), then it may be relatively easy for the patentee to locate producers and initiate negotiations.¹⁵² In some cases, particularly where unwary consumers may be involved, the patentee can effectively "spread the word" (as George Selden did) about the hazards created by upstream unlawful uses of their works.¹⁵³ While it certainly conceivable that in some cases, the patentee does not have any truly reasonable precautionary measures available to her, this is not true of the majority of cases. In most cases, the probability of a patent accident is determined not simply by the actions of the technology user, but also by the actions of the patentee. Let us call this *patentee care* or C^p .

It is often underappreciated that taking these measures are themselves costly: it costs the technology user resources to search the register; it costs the patentee resources to appropriately mark products. Let us call this cost the *prevention costs* or B (i.e. the parties select a level of care, C , thus imposing a level of cost, B). Let us call the technology user's prevention costs B^u and the patentee's prevention costs B^p .

¹⁴⁸ See e.g. Claire Curran, *A Simple Guide to Marking Your IP Rights*, UDL INTEL. PROP. (May 21, 2018).

¹⁴⁹ See Christine Sharkey, *Strategic Assertions: Evading the Patent Marking Requirement*, 12 NW. J. TECH. & IP 103 (2014).

¹⁵⁰ See generally United States Patent and Trademark Office, Report on Virtual Marking (2014). See also Gaétan de Rassenfosse, *Notice Failure Revisited: Evidence on the use of Virtual Patent Marking*, NBER Working Paper No. 242888 (Feb. 2018). It is questionable whether the marking requirements currently provide adequate incentives to innovators to mark, see Menell and Meurer, *supra* note 86 at 37 ("both patent and copyright law have weakened marking requirements over the past several decades as well as penalties for failure to provide accurate notice information.")

¹⁵¹ Menell and Meurer, *supra* note 85, at 37. Menell and Meurer consider the possibility of Congress mandating this precautionary measure from all companies.

¹⁵² *Supra* note 142.

¹⁵³ *Supra* note 41.

3. Minimizing the Total Costs

If the user takes care, C , the probability of an accident goes down, and so too does expected accident costs, pA . Thus, care has a positive effect on society's welfare. Simultaneously however, as the level of care rises, so too does the prevention costs, B . As a result, taking more care, or trying to prevent all accidental infringements, is not necessarily the best social outcome. In order to minimize the total cost society loses on accidental infringement, the user must select a level of care that results in the least overall cost, taking into account both the probable accident costs and the prevention costs.¹⁵⁴ As a rule of thumb, it is safe to say that in most cases taking some care will help reduce total cost, but that beyond a point, taking more care becomes wasteful and has a negative effect on society's purse.

As an analogy, consider road traffic accidents. If motorists drive slower, that will reduce the probability of accidents and thus their cost. But, this reasoning would not justify a complete ban on driving; clearly, if we were to ban driving completely society would be worse off. As Guido Calabresi famously pointed out in 1970, if we were to ban driving, the precautionary measure used to avoid the accidents would impose more cost on society than simply allowing the accidents to occur.¹⁵⁵ To put it bluntly, we accept that some level of road traffic accidents will occur because it would be too costly to prevent it happening.

The same is true in patent law today. If technology users take some level of care, e.g. by searching the patent register, that will often reduce the chances of an accident occurring and help lower total accident costs. But that is only true up to a point. At a certain point, the reverse is true and the costs of preventing the patent infringement outweigh the benefit it produces. For example, it would obviously be negative for society if all inventors were required to "down tools" and stop inventing whenever there was a risk that such technical activity would infringe a patent. Therefore, our goal ought not to be the complete eradication of patent accidents altogether. Instead, the optimal situation is for users to adopt a *reasonable* (i.e. *cost-justified*) level of care. More formally, the user ought to take care up to the point that when the marginal cost of such care equals the marginal benefit represented by the reduction in expected accident cost; the user ought not to go beyond that point.

Table 1 illustrates this principle. Consider a hypothetical situation in which only the technology user can take care to prevent the patent accident occurring. For example, the technology user has invented a new type of mousetrap and is considering whether to commercially sell this product. But she is concerned that the mousetrap may already be patented. If she does not compensate the patentee for use of the mousetrap, the patentee will suffer a private cost of \$100. At this point, she has three options: she could not search the patent register, she could spend 1 hour searching the register, or she could spend 2 hours searching the register. The probability of accident plus the costs associated with the level of care are depicted in the table.

¹⁵⁴ Arguably the cost of patent accidents involves an additional cost, i.e. the cost of duplicative R&D efforts. The social cost of the patent accident is not merely the cost to the patentee and the subsequent depression of innovation incentives, but also includes the resources society spends on recreating a technology which is already exists. See generally WILLIAM LANDES & RICHARD POSNER, *THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY* 302 (Harvard Univ. Press, 2003). However, for a number of reasons, the Article brackets this potential cost. It is not clear whether the majority of accidental infringement cases involve any significant duplication costs. For example, the *Schmeiser* case, discussed *supra* note 75, the *Innovatio* cases, discussed *supra* note 43, or the *Rambus* case, discussed *supra* note 48, did not involve any wasteful duplication efforts on behalf of the technology user. Furthermore, when some duplication is involved, such as in *NTP v RIM*, the second-comer's R&D can equally lead to benefits in terms of slightly differentiated products with the capacity to better supply consumer demand, see generally Christopher S. Yoo, *Intellectual Property and the Economics of Product Differentiation*, in 1 Research Handbook on the Economics of Intellectual Property Law (Ben Depoorter & Peter Menell eds., Edward Elgar 2018). As a result, it is difficult to say to what extent duplicative efforts exist and impose cost on the patent system. As a result, how these costs factor into the basic analysis is left to another day.

¹⁵⁵ Calabresi, *supra* note 24.

Table 1: User Care

	Cost of Care	Probability of Accident	Expected Accident Loss	Total Social Cost
0 Hour Search	0	15%	15	15
1 Hour Search	3	10%	10	13
2 Hour Search	6	8%	8	14

In this scenario, total social cost is minimized if the user spends 1 hour searching the register for the patentee. Spending 1 hour searching is cost-justified because while it imposes a marginal cost of \$3, it produces a marginal benefit of \$5 (i.e. the expected accident costs reduce by \$5). However, spending a second hour searching is not cost-justified. A second hour searching imposes a marginal cost of \$3 but only produces a marginal benefit of \$2. Thus, social cost is minimized if, and only if, the user takes cost-justified care.

In most real-world situations, both the technology user and the patentee can take some cost-justified precautions to avoid the accident. Minimizing the total social cost of patent accidents often requires the technology user to perform a patent register search, but also requires the patent holder to provide appropriate notice of the patent rights by drafting clear claims, by marking the product in an accessible manner, and by searching for technology users. Table 2 illustrates this intuition. Consider once again the technology user that is considering whether to sell her mousetrap, and has the option to spend between 0 and 2 hours searching the patent register. Further, imagine that the patentee also has the ability to take care at the same cost: the patentee also can spend between 0 and 2 hours searching for potential users of her patented mousetrap. These “care options” are laid out below.

In a case such as this, the optimal situation is **e**: both parties take 1 hour care. As in the previous table, the cost-justified level of precaution for the user is to 1 hour care. Any less care (options **a-c**) or any more care (option **g-i**) would result in higher social cost. Likewise, it is also cost-justified for the patentee to spend 1 hour searching: the marginal benefit of \$4 in reduced expected accident costs exceeds the marginal cost it imposes of \$3. However, spending the second hour searching is not cost justified because the marginal cost it imposes outweighs the reduction in expected accident costs.

Table 2: User Care and Patentee Care

	User Care (Hours Search)	Patentee Care (Hours Search)	User Care Cost	Patentee Care Cost	Probability of Accident	Expected Accident Costs	Total Social Cost
a.	0	0	0	0	15%	15	15
b.	0	1	0	3	11%	11	14
c.	0	2	0	6	10%	10	16
d.	1	0	3	0	10%	10	13
e.	1	1	3	3	6%	6	12
f.	1	2	3	6	5%	5	14
g.	2	0	6	0	8%	8	14
h.	2	1	6	3	5%	5	14
i.	2	2	6	6	5%	5	17

The table illustrates another important principle: minimizing the total social cost of patent accidents cannot be achieved by simply identifying the “least cost avoider.”¹⁵⁶ Sometimes the argument is made that generally the user can take more effective measures to prevent the accident

¹⁵⁶ Commonly, a least cost-avoider (LCA) model is used to allocate responsibility in unilateral rather than bilateral accidents. In patent law, accidents are bilateral because both parties can affect the probability of an accident. But what if only one party can take efficient precautionary measures? Or alternatively, what if both parties can take care, but because their care would be largely duplicative, it is better if only one party take care? In these cases, law and economics literature often recommends identifying the party which could avoid the accident at the least cost and allocate the responsibility wholly to that party, *see* SHAVELL, *supra* note 00, at 18 (“[B]oth injurers and victims generally ought to do something to avoid risk; the effect of liability rules is therefore different from that in the least-cost avoider model.”).

This version of the LCA analysis ought not to be confused with the LCA analysis provided in Chiang, *supra* note 11. Chiang argues that patent law ought to place the burden on the party that can avoid the accident at the least cost. However, Chiang’s analysis is more sophisticated than most common versions of the LCA discussed in patent law. Chiang’s LCA analysis is a *marginal* analysis. That is, the law will impose the responsibility on the LCA, but it will do so *ex post*. Parties will not know until litigation who is the LCA. The court will then compare the parties’ relative search costs and then determine the LCA. As a result, the parties will not know in advance which party is the LCA, and this will give them the incentive to *both* parties to conduct reasonable cost-justified searches ahead of time. A patentee, for example, will not know whether she is will be held the LCA, and accordingly will perceive a risk that she will be held to be the LCA and thus contributorily negligent if she fails to perform a reasonable search. As a result, Chiang’s proposal is appropriate to a bilateral accident model.

As a result, Chiang’s analysis aims to set incentives for bilateral care just as the analysis in this Article.

Nevertheless, some questions linger about the marginal LCA analysis. Most importantly, I find the analysis a little convoluted. Standard accounts of accidents typically split accidents into unilateral and bilateral accidents: in the former, economists suggest that the law should allocate the responsibility for avoiding the accident to the LCA, whereas in the lateral, economists suggest the law should allocate the responsibility using a negligence rule, *see* SHAVELL, *supra* note 34, at 18. I worry that transporting the LCA concept into the bilateral accident arena makes matters more confusing than it needs to be and accordingly invites misunderstandings (*See* Shavell, *supra* note at 34 at 18 (“The model of least-cost avoider may be misleading for thinking about the class of bilateral accidents examined in this book.”)). Chiang clearly tries to prevent those misunderstandings in the article, but the nuances of this analysis may very well be missed by even reasonably alert readers. Secondly, I am not entirely convinced that if a court were to determine the LCA *ex post*, this would always lead to adequate incentives for bilateral care *ex ante*. For example, imagine the user finds a product that she suspects is patented, but which has no patent marking. The user may accurately predict that a court in such circumstances would hold the patentee to be the LCA, on the grounds that adequate patent marking is lacking. The user may still be able to take some reasonable measures in this case, such as performing a search of the registry. However, knowing in advance the likelihood that the patentee would be deemed the LCA, would the user still adopt these reasonable measures?

than the patentee, and therefore the responsibility should wholly fall on that user to avoid the accident.¹⁵⁷ But while often true, this criticism is beside the point. Even if the user has generally more effective measures than the patentee, the patentee may still have some cost-justified precautionary measures which, if taken, would further reduce the accident costs. The goal should be to encourage all parties who can take non-duplicative cost-effective care to do so, rather than simply set incentives for one party.

The table demonstrates this claim. In the scenario, the user has the more effective precautionary measures: in option **d**, the user takes one hour care reducing the probability of the accident by 5%, whereas in option **b**, the patentee takes one hour care thus reducing the accident probability by 4%. Therefore, if the choice is to make *either* the user *or* the patentee take 1 hour care, then making the user take care is preferable because it results in less cost (i.e. \$13 instead of \$14). However, these two options are both less preferable to the optimal situation, option **e**, wherein *both* parties take 1 hour care: this option reduces cost to \$12. This situation occurs because user care and patentee care often have a synergetic effect: the effect of the precautionary measures are not simply cumulative, but have an effect greater than the sum of its parts.

Now that we understand our goal (i.e. that both users and patentees should take cost-justified measures to avoid the accident), the question becomes: What liability rule ought we impose to achieve this outcome? What liability rule would help achieve this end? Subsequent to Calabresi, legal economists have analyzed when, and in what circumstances, different liability rules help minimize accident costs (most notably, Shavell,¹⁵⁸ Landes & Posner,¹⁵⁹ and Cooter & Ulen¹⁶⁰). The following Sections apply the analytical frameworks and insights developed in this literature to the particular problem of minimizing the cost of patent accidents.

B. Liability Rules Compared: Primary Considerations

Having demonstrated that efficient use of resources requires the patentee and the user to take cost-justified preventative measures, the question we must answer next is: Which liability rule will encourage the parties to take such care? This Section compares various liability rules in relation to this goal. The following section introduces some further variables (or “secondary considerations”) into the analysis.

1. No Liability

Under a no liability rule, the user is not liable for the accidents she causes. Therefore, the accident costs remain with the patentee. Thus, the patentee pays for the costs of her precaution and the expected accident costs (i.e. $B^p + pA$). Meanwhile, the user only pays the costs of her precautions (B^u). Both patentee and user are assumed to be rational actors who will select a level of care (C) to minimize their own private cost.

Using our mousetrap example from earlier, Table 3 demonstrates the private costs that the parties would bear under various different liability rules. The care options in Table 3 mimic those found in Table 2. From this table, we can see that under a no liability rule, the parties will not select the optimal levels of care, i.e. option **e**. While the *patentee* will take the appropriate care, the technology *user* will not.¹⁶¹ As the technology user is still liable for willful infringement, the patentee’s best financial strategy is to alert the user to the patent, thus improve the chances of a licensing deal. On the other hand, in order to minimize her private costs, the technology user will select to spend 0 hours searching, i.e. options **a-c**. From these options, the patentee will select to spend 1 hour searching because this minimizes her private expenditure (i.e. she spends \$14 rather than \$15 or \$16). Therefore, the equilibrium is that the parties will select option **b** and total social cost will be higher than optimal (**e**).

¹⁵⁷ See Chiang, *supra* note 11 at 10-14 (summarizing versions of this view).

¹⁵⁸ *Supra* note 34.

¹⁵⁹ RICHARD POSNER & WILLIAM M. LANDES, THE ECONOMIC STRUCTURE OF TORT LAW (1987)

¹⁶⁰ ROBERT COOTER & THOMAS ULEN, LAW AND ECONOMICS (2016).

¹⁶¹ This is, of course, a highly stylized analysis. In reality, a range of other doctrinal mechanisms (see e.g. 35 USC 112 definiteness requirement) and practical realities encourage some patentee care. However, the preceding discussion reveals that these instruments alone lead to sub-optimal incentives as evidenced by the high rate of accidental infringement. Therefore, this analysis strips those considerations away to first establish what liability rule is appropriate, and then later in Part IV analyzes some of the doctrines already in place to encourage such care.

2. Strict Liability

Under a strict liability rule, the user must pay the patentee compensatory damages, or a liability award, L , which is equal to the accident costs. Therefore, the patentee only bears the cost of her own precaution (B''), while the technology user pays the costs of her precaution and the expected liability award (i.e. $B'' + pL$). Once again, both parties select a level of care that will minimize these costs. The parties' private costs associated with this liability rule are found above in Table 3.

This rule will once again result in sub-optimal behavior. The patentee will minimize her costs by selecting 0 hours search, i.e. options **a**, **d**, or **g**. Meanwhile, the defendant will select to perform 1 hour search because this minimizes her cost (she pays \$13 rather than \$14 or \$15). The resulting in equilibrium is option **d** and total social cost is higher than optimal.

Table 3: Private Cost Under Liability Rules

	No Liability		Strict Liability		Simple Neg.		Strict Liability + Contributory Neg.		Neg. + Contributory Neg.		Comparative Neg.	
	U cost	P cost	U Cost	P cost	U cost	P cost	U cost	P cost	U cost	P cost	U cost	P cost
a.	0	15	15	0	15	0	0	51	0	15	7.5	7.5
b.	0	14	11	3	11	3	11	3	11	3	11	3
c.	0	16	10	6	10	6	10	6	10	6	10	6
d.	3	10	13	0	3	10	3	10	3	10	3	10
e.	3	9	9	3	3	9	9	3	3	9	3	9
f.	3	11	8	6	3	11	8	6	3	11	3	11
g.	6	8	14	0	6	8	6	8	6	8	6	8
h.	6	8	11	3	6	8	11	3	6	8	6	8
i.	6	11	11	6	6	11	11	6	6	11	6	11

3. Negligence

In contrast to strict liability and no liability, this Section demonstrates that a negligence rule would encourage cost-justified care from both parties. A liability rule is categorized as a negligence rule if the decision to impose liability is conditional upon one or more party's level of preventative care falling below an acceptable level.¹⁶² There are multiple different forms such a negligence rule could take: simple negligence, strict liability plus a contributory negligence defense, negligence plus a contributory negligence defense, or comparative negligence; each one provides incentives for bilateral cost-justified care.¹⁶³

¹⁶² See Cooter & Ulen, *supra* note 160, at 189-228.

¹⁶³ *Id.*

Under a simple negligence rule, the technology user pays compensatory damages if she fails to take all *reasonable* care.¹⁶⁴ Care is considered “reasonable” if it is cost-justified (this is the famous Learned Hand formula where care is considered reasonable if the marginal benefit it produces is greater than the marginal cost it imposes).¹⁶⁵ Therefore, if a technology user fails to take all reasonable care, she will pay a liability award plus any care she does take (i.e. $B'' + pL$); meanwhile, the patentee in this situation will only pay for her own precaution costs (i.e. B^p). Alternatively, if a technology user does take all reasonable care, she will only pay for the cost of her care (i.e. B''); meanwhile, the patentee will pay for her care and any remaining expected accident costs (i.e. $B^p + pA$). The private costs the parties face under a negligence rule are above in Table 3. Under this rule, a technology user will minimize her costs by selecting 1 hour search. Taking any care below this level exposes her to liability, while taking care above this level imposes extra prevention costs. Therefore, the technology user will select option **d**, **e**, or **f**. From these options, the patentee minimizes her costs by selecting 1 hour care. The equilibrium is that both parties take the appropriate level of care and social cost is minimized.

Under a strict liability rule with a contributory negligence, the user is liable for all accidents she causes, unless the patentee is contributorily negligent.¹⁶⁶ If the patentee is contributorily negligent, the user is not liable. A defendant is contributorily negligent if she failed to take all reasonable care to prevent the accident. Once again, reasonable is equated with cost-justified precaution. Therefore, if the patentee takes reasonable care, then the patentee pays for her own care costs (B^p), while the technology user pays for her own care costs and expected liability ($B'' + pL$). If the patentee fails to take reasonable care, then the patentee pays for her own care plus any expected accident costs ($B^p + pA$), while the user pays for her care costs only (B''). Table 3 lists the private costs the parties face under this rule. Under this rule, the patentee will select to perform 1 hour search (i.e. options **b**, **e**, or **h**) as this minimizes her costs (i.e. \$3). From these options, the user will select option **e** as this minimizes her costs. The result is the parties’ select option **e** and total costs are minimized.

Under a negligence rule with a contributory negligence defense, the user is liable for accidents caused by her negligence, unless the patentee was also negligent. Once again negligence is defined as failure to take reasonable care according to the Learned Hand Formula.¹⁶⁷ Under this rule, the following options emerge: (1) if the user takes reasonable care, she bears the cost of her own precaution only (B''); meanwhile the patentee bears the cost of her own precaution plus any remaining expected accident costs (i.e. $B^p + pA$); (2) if the user fails to take reasonable care, and the patentee takes reasonable care, then bears the cost of her own precaution and any expected liability costs ($B'' + pL$); meanwhile, the patentee pays for her own precaution costs (B^p); if the user fails to take reasonable care, and the patentee also fails to take reasonable care, then the user bears only her own precaution costs (B''); meanwhile the patentee pays for her own precaution costs and any remaining expected accident costs ($B^p + pA$). Table 3 demonstrates the private costs associated with each liability rule. Under this rule, the patentee has an incentive to take cost-justified precaution. By searching for one hour, the patentee can minimize her own private costs (any less than this exposes her to the possibility of being held contributorily negligent and paying for the expected accident costs; any more than this unnecessarily increases her precaution costs). If the patentee can be expected to search for one hour, then the options for the technology user are options **b**, **e** and **h**. To minimize her private costs she will select option **e** (any less exposes her to liability, any more than that is unnecessary to avoid liability). Once again, the optimal choice is reached.

Lastly, under a comparative negligence rule, the user is not liable when she takes due care. If she fails to take due care, then she will be liable. However, if she fails to take due care, and the patentee also fails to take due care, then the court will apportion the accidents costs between the two parties according to their level of fault.¹⁶⁸ Therefore, the following options emerge: (1) If the

¹⁶⁴ *Id.* at 196.

¹⁶⁵ *Id.* at 205-08.

¹⁶⁶ *Id.* at 208-11.

¹⁶⁷ *Id.* Note, this is distinct from the type of “contributory negligence” rule used in other common law systems, particularly the U.K. where “contributory negligence” refers to a reduction in damages proportional to the defendant’s fault, *see* Law Reform (Contributory Negligence) Act 1945 §1 (UK).

¹⁶⁸ *Id.*

user takes reasonable care, she bears the cost of her own precaution only (B''); meanwhile the patentee bears the cost of her own precaution plus any remaining expected accident costs (i.e. $B^p + pA$); (2) if the user fails to take reasonable care, and the patentee takes reasonable care, then the user bears the cost of her own precaution and any expected liability costs ($B'' + pL$); meanwhile, the patentee pays for her own precaution costs (B^p) (3) if the user fails to take reasonable care, and the patentee also fails to take reasonable care, then the user bears her own precaution costs and a *portion* (assumed here to be half) of the accident costs in liability ($B'' + pL/2$); meanwhile, the patentee pays for her own precaution costs and any remaining expected accident costs ($B^p + pA/2$). Table 3 demonstrates the private costs associated with each liability rule. Under this rule, the technology user minimizes her own costs by taking one hour care (options **d-f**). Thereafter, the patentee minimizes her costs by selecting one hour care. The equilibrium is option **e**, and total cost is minimized.

C. Liability Rules Compared: Secondary Considerations

Thus far, the analysis has demonstrated that all versions of a negligence rule are preferable to a strict liability rule or no liability. Because negligence rules encourage both technology user and patentee to take cost-justified precautions, such rules help minimize total social cost. By selecting a level of care that conforms to the standard of reasonable care as defined by the Hand formula, each party has the ability to shift the accident costs onto the other party, thus minimizing their own private costs. This Section introduces further considerations that complicate the analysis, but that also help us select which version of a negligence rule is preferable. Those secondary considerations are: activity levels, administrative costs, error costs, and externalities.

1. Activity Levels

Taking more precaution is not the only way the parties can reduce the chances of an accident occurring. The other option is for the parties to change their activity levels.¹⁶⁹ For example, in road traffic accident cases, drivers could reduce the possibility of an accident by not speaking on their cell phones while driving, but they could also reduce the probability of an accident simply by driving less. Likewise, in patent law, the technology user could reduce the probability of a patent accident by engaging in technical activities less often, and the patentee could also reduce the probability of an accident by reducing their level of innovation. However, the parties engage in these activities because doing so brings them utility. Therefore, while engaging in the activity less reduces the chances of harmful accidents, it also reduces the utility the parties receive. Table 4 illustrates this relationship.

Table 4: Activity Levels

	User Activity	User Utility	User Care Cost	Ptee Activity	Ptee Utility	Ptee Care Cost	Total Accident Losses	Total Social Welfare
1	1	40	3	1	40	3	20	54
2	2	60	6	2	60	6	40	68
3	3	69	9	3	69	9	60	60
4	4	75	12	4	75	12	80	42
5	5	70	15	5	70	15	100	10

Table 4 assumes that both the user and the patentee are now considering how much time to spend on the activity that may create patent accidents (i.e. innovation). Each party acts to maximize their own private utility. Total social welfare is calculated by adding the user utility and the patentee utility and subtracting the user care costs, the patentee care costs, and the total

¹⁶⁹ *Id.* at 211-13.

accident costs. Option 2 – both parties engage in the activity 2 times – is optimal as this maximizes social welfare. Table 5 depicts the utility each party would receive under various different liability rules.

Table 5: Activity Levels under Liability Rules

	No Liability		Strict Liability		Simple Negligence		Strict Liability + Contributory Negligence	
	User Utility	Ptee Utility	User Utility	Ptee Utility	User Utility	Ptee Utility	User Utility	Ptee Utility
1	40	17	17	40	37	17	17	37
2	60	14	14	60	54	14	14	54
3	69	0	0	69	60	0	0	60
4	75	-21	-17	71	63	-21	-21	63
5	70	-45	-45	70	55	-45	-45	55

Under no liability, the user will engage in too much technical activity (in addition to not taking sufficient care), whereas the patentee will engage in the optimal amount of technical activity.¹⁷⁰ The user maximizes her utility by simply selecting an option which yields the highest utility, i.e. option 4. Meanwhile, the patentee bears the cost of any care she takes and the expected accident costs. To maximize utility, the patentee sets an activity level that yields the highest utility minus the cost of care and the expected accident costs, i.e. option 2. Meanwhile, a strict liability rule yields the opposite conclusion. The user sets an activity level that maximizes her utility minus the cost of care and the expected accident costs, i.e. option 2, while the patentee selects an activity level that yields simply the highest utility, i.e. option 4.

More important, however, is the difference between the activity levels under a simple negligence rule and a strict liability rule with a contributory negligence defense. Under the simple negligence rule, the user will select an activity level that maximizes her utility minus the cost of care, i.e. option 4; the patentee meanwhile selects an activity level that maximizes her utility minus the cost of care and any remaining accident costs, i.e. option 2.¹⁷¹ Therefore, the user engages in the activity too frequently, but the patentee does so at the optimal level. This is because the patentee is the *residual bearer of the harm*.¹⁷² Under a negligence rule, as demonstrated earlier, both parties will take cost-justified precautions. Nevertheless, there is still an expected accident cost when both take such precautions. The question is: Who bears this cost? In negligence, it is the patentee who bears this cost: as the user takes due care, she is not liable and the expected costs remain with the patentee.

Under a strict liability rule with contributory negligence, the opposite result is achieved because now the *user* and not the patentee is the residual bearer of the harm. Under this rule, the patentee will set her activity level that maximizes utility minus the cost of care. Meanwhile the user will set an activity level that maximizes her utility minus the cost of care and the expected accident costs.¹⁷³ As a result, the user will engage in the activity at the optimal level, but the patentee does not. Likewise, under a negligence rule with contributory negligence, the patentee is the residual bearer of harm, therefore will take the appropriate activity level, but the user will not. The same is true for comparative negligence.

What this demonstrates is that no liability rule yields incentives for both bilateral care and optimal bilateral activity levels. Any form of negligence rule will result in only one party internalizing the benefit of adopting an appropriate activity level, and as a result the other party

¹⁷⁰ *Id.*

¹⁷¹ *Id.*

¹⁷² *Id.*

¹⁷³ *Id.*

will engage in the activity at too great an extent. The only theoretical exception to this would be if judges take activity levels into account when defining reasonable care under the Hand Formula. However, it is generally agreed that judges do not have the institutional ability to determine how much of an activity a private party ought to engage in (e.g. how many miles someone ought to drive their car).

The normal response to this by economists of tort law is to make the party whose activity is more likely to yield accidents the residual bearer of the harm.¹⁷⁴ For example, accidents involving motors and bicycles involve bilateral care: cars can drive slower and with more observations, cyclists can wear appropriate colors and lights; it is optimal for both parties to take some level of care. However, the party who has the most control over the accident is likely the motorist – no amount of brightly colored vests will prevent the accident if the motorist drives with very little awareness of her surroundings. Ideally therefore, a strict liability + contributory negligence rule ought to be adopted. In which case, both motorists and cyclists will take an optimal care level, and because the motorist is the residual bearer of the harm, the motorist will select the appropriate activity level; the cyclist will not take the appropriate activity level and spend too much time cycling, but this is less dangerous than motorists spending extra hours on the road.

What does this mean for patent accidents? The answer is: surprisingly little! Having already established in section B that it is preferable to adopt some form of negligence rule to ensure bilateral care, the pressing question is: Which version of the negligence rule is preferable? However, we see that whatever version we choose will result in one party selecting an activity level that is higher than optimal. If a simple negligence rule is adopted, the user will engage in too much technical activity because she is not the residual bearer of harm (and the same for negligence + contributory negligence or comparative negligence); whereas if a strict liability rule with a contributory negligence defense is adopted the patentee will engage in too much technical activity. Therefore, we need to pick between the lesser of two evils: too much activity from the patentee or from the user.

The problem this presents is twofold. First, I am unconvinced that controlling the level of activity – innovation – is, as a practical matter, likely to improve social welfare. Innovations come with very significant positive externalities (or “spillovers”): new innovations spur future innovations in unpredictable and often very significant ways, and much of this value is not captured by the patentee.¹⁷⁵ While the law of diminishing marginal utility makes it clear that at some point investing in further innovation must become socially excessive, it seems unlikely that we are at such a point today. As a practical concern, the level of compound growth created by innovation suggests that the positive externalities associated with greater innovation will nearly always be greater than the social loss flowing from increased accident costs.¹⁷⁶ Thus the “optimal” activity level seems of minor significance.

However, put this concern to one side and assume that there is an optimal level of innovation that the parties ought to be engaging in from a welfare point. Even if we assume this, it is not clear that either party’s activities are more important to control in order to closer reach the social optimal. To decrease the expected accident costs, is it more important for the *user* to engage in less innovation, or is it more important for the *patentee* to engage in less innovation and to patent less frequently? I do not see a clear answer to this question. It seems initially that both parties’ activities have an equal effect on the probability of an accident occurring. While there certainly may be individual cases where one party’s activities may contribute greater to the chances of an accident, it is hard to say with any confidence whether globally, across the whole range of patent infringement, controlling the patentee’s or user’s activities is comparatively more important.¹⁷⁷

Therefore, the importance of activity levels ought to be largely bracketed when asking

¹⁷⁴ *Id.*

¹⁷⁵ See Brett M. Frischmann & Mark A. Lemley, *Spillovers*, 107 COLUM. L. REV. 257, 259 (2007).

¹⁷⁶ Robert Cooter, *The Falcon’s Gyre: Legal Foundations of Economic Innovation and Growth* (2014) (arguing that “innovation causes compound growth that swamps static inefficiency like a tsunami swamps a cow.”).

¹⁷⁷ This conclusion seems to stand even if the technology user is merely a non-innovative manufacturer/distributor. Society would not seem particularly well-served by trying to control the amount of products that are made and distributed any more than it would be by limiting the amount of innovation.

which is the optimal liability rule. To determine which is the best form of liability rule, we will need to spend more time focusing on the following criteria: administrative cost, error cost, and externalities.

2. Administrative Cost

Whatever rule is selected, actors in the legal system will need to apply the rule to real world cases. Different liability rules lead to greater or lesser amounts of such administrative costs.¹⁷⁸ The cost of application depends on a number of factors, the most important of which are the complexity of the rules, and the number of cases requiring resolution.

Strict liability is a relatively straight forward rule to apply, but it also leads to a high number of infringement cases.¹⁷⁹ The rule is straightforward in application because, unlike negligence, the court is not required to conduct a complex factual inquiry into the reasonableness of the defendant's behavior.¹⁸⁰ However, this initial cost saving is diminished because the strict liability rule results in more cases of infringement. Under a strict liability rule, nearly all cases of infringement will require some form of resolution. At its most costly that resolution will take the form of litigation and adjudication. But even cases which do not involve litigation will produce additional costs. In all cases of infringement, the patentee will attempt to shift the cost to the technology user, and this will involve procedure and associated costs. In the absence of litigation, that cost will come through alternative dispute resolution, inter-party negotiation, damage calculations, and transferring monetary compensation. By contrast, a negligence rule has the benefit of removing a subset of infringement cases and eliminating their associated resolution costs. Thus, a negligence rule has the benefit of reducing the amount of case resolution, although each case of infringement involves increased complexity.¹⁸¹

Which would involve less administrative costs overall? It is difficult to say with confidence. The question depends on whether more frequent litigation, or more complex litigation, is a more significant contributor to the cost of the patent system. When comparing liability rules generally, strict liability is typically seen as the least administratively costly rule. On the other hand, existing empirical evidence suggests that the administrative costs of patent liability are currently very high, and this may be in part due to the current strict liability rule. Bessen and Meurer's empirical analysis of the U.S. patent system found that patent litigation costs have "exploded" over past decades.¹⁸² The cost of the patent litigation annually for firms (excluding chemical and pharmaceutical firms) increased six-fold from 1984 to 1999 (from less than \$184 billion to \$1,104 billion).¹⁸³ What is driving this explosion? The authors conclude that the "increase in aggregate litigation cost is mainly driven by the increasing frequency of litigation, which has roughly tripled since the 1980s."¹⁸⁴ Litigation cost is exploding not only because trials are becoming more complex and time consuming,¹⁸⁵ but primarily because the volume of litigation is increasing. While ultimately, we do not have sufficient empirical evidence to fully determine the administrative costs of each liability rule, we can certainly say that a strict liability

¹⁷⁸ See Cooter and Ulen, *supra* note 160, at 223-25.

¹⁷⁹ *Id.*

¹⁸⁰ Furthermore, the rule is also easier to apply for individual parties. Currently under strict liability, patentees do not need to assess the technology user's level of care prior to deciding to take action or not, whereas they would under a negligence rule. Under a negligence rule, not only would courts in litigation need to spend more resources on examining the defendant's care, patentees would spend more resources on discovery and exploratory litigation to determine the defendant's level of care.

¹⁸¹ While negligence can increase the complexity of cases, it also has the potential to limit their complexity. In a subset of cases, it will be relatively easy for a court or fact finder to determine whether the defendant behaved negligently. In such cases, the decision maker can potentially determine the outcome of the case by examining the negligence issue only, without making a ruling on typically complicated matters such as claim construction.

¹⁸² Bessen & Meurer, *supra* note 8, at 16.

¹⁸³ *Id.*

¹⁸⁴ *Id.*

¹⁸⁵ Although, that indeed is happening due to the increasing complexities of claim construction, see generally Tun-Jen Chiang & Lawrence Solum, *The Interpretation-Construction Distinction in Patent Law*, 123 YALE L.J. 530, 572-92 (2013); Dan L. Burke & Mark A. Lemley, *Fence Posts or Sign Posts? Rethinking Patent Claim Construction*, 157 PENN L. REV. 1743 (2009).

regime is not conclusively less administratively costly than a negligence liability rule.¹⁸⁶

Finally, it is worth noting that to the extent that a negligence rule is more complicated to apply, this cost is mitigated by the doctrine of *stare decisis*. Over time, courts applying a negligence standard will develop categories and clearer proxy rules for identifying negligence. This will aid in reducing the cost of applying the reasonableness test in future cases.

3. Error Cost

Courts are likely to make errors when applying the liability rule. In particular, courts may make errors when calculating the level of damages, or courts may make errors in defining the reasonable care standard.¹⁸⁷ Both of these errors, if made consistently, could lead to the parties adopting sub-optimal levels of care.

A strict liability rule is highly prone to erroneous damage calculations. As demonstrated above in Table 3, a strict liability rule will incentivize the technology user to adopt an appropriate level of care. However, this assumes the liability award, L , is set equal to the accident costs. If the liability award is greater or less than the accident cost, A , then the user will take more or less than the optimal care level. Currently, under a strict liability rule, it is assumed that the patentee will take no care, and the user has a choice of taking 0 hours care, 1 hour care, or 2 hours care. One hour care is optimal, and because this option lowers the user's costs (this option costs her \$14 whereas option **a** costs \$16 and option **g** costs \$15), she will take this care. However, if the court erroneously calculates the damages and the liability award is double the actual damages, then the user has a choice of taking 0 hours care (for \$30), 1 hour care (for \$25), or two hours care (for \$24). In this scenario, the user will take greater than optimal care because the liability award is much higher than the compensatory level. Therefore, while errors in judging reasonable care are impossible when applying a strict liability rule, errors in calculating damages are a significant challenge to setting the appropriate incentives for care.

A simple negligence rule is the mirror image of a strict liability rule: while courts will make errors in applying the standard of care, errors in calculating damages are far less significant than in strict liability.¹⁸⁸ Errors in applying the standard of care are highly significant. If the court sets the standard too high, technology users will over-invest in care. For example, in Table 3, imagine the court miscalculates the cost of the technology user's patent search, and believes the cost of the second hour searching is only \$1 (not \$3). Under the Hand formula, a court would find that a reasonable person would take this extra hour searching (because now the marginal benefit of \$2 in expected accident cost saved is greater than its marginal cost of \$1).¹⁸⁹ As a result, the user would have an incentive to conform to that higher standard, and take 2 hours care, to avoid a liability award, even though doing so deviates from the optimal care level. Likewise, if courts routinely set the standard of care too low, defendants will frequently under-invest in care.¹⁹⁰

On the other hand, the incentives for care set by a negligence rule are far less susceptible to distortions created by erroneous damage calculations, so long as the standard of care is optimally set. If the standard of care is set at the correct level, the defendant has an incentive to conform to that standard, and thus avoid a liability award, regardless of the level of damages. For

¹⁸⁶ One potential counter-argument is that the increased uncertainty of a negligence rule will increase the amount of litigation, following the Priest-Klein hypothesis that win rates for plaintiffs tend towards 50 percent in cases where litigants have symmetric stakes, *see* George Priest and Benjamin Klein, *The Selection of Disputes for Litigation*, 13 JOURNAL OF LEGAL STUDIES 1 (1984). However, to the extent that this is true, the effect must be balanced against the counter-veiling affect that the scope of infringement is decreased under negligence, that negligence sets better incentives for accident precaution, and that in many cases defendants will know in advance whether they have successfully adopted reasonable care thus limiting the uncertainty of the rule. When appreciated globally, it seems more likely that infringement cases will decrease under negligence, however the margin of such decrease will likely be smaller given the small potential for increased litigation flowing from uncertainty in the negligence rule.

¹⁸⁷ *See* Cooter & Ulen, *supra* note 160, at 217-20.

¹⁸⁸ *Id.*

¹⁸⁹ *Id.*

¹⁹⁰ A related point is that a negligence defense rule may open the door to opportunistic behavior. Defendants who know of the patent may nevertheless document efforts at reasonable accident precaution in the hope that the paper trail may hide their intentional infringement. However, this would be a risky strategy for a defendant to adopt. In such cases, their infringement is willful. If the willfulness is discovered, they will face enhanced damages. The risk of hiding their intentional infringement in this manner would need to be weighed against the risk of enhanced damages. *See generally* Dmitry Karshedt, *Enhancing Patent Damages*, 51 U.C. DAVIS. L. REV. 1427 (2018).

example, consider the case just introduced where the court sets the liability award at double the accident costs. But, now consider the case under a negligence rule where the court accurately sets the standard of care. In this case, if the user adopts 0 hours care, her expected liability is \$30. But if she takes one hour care, she is not liable and only pays her cost of care, i.e. \$3. If she adopts two hours of care, she is once again not liable and pays only the cost of care, i.e. \$6. Thus, if the standard of care is set correctly, errors in damage calculations are insignificant, because the parties have the incentive to conform to the cost-justified care required by the negligence rule.¹⁹¹

Unfortunately, strict liability plus contributory negligence is the worst of both worlds. As the technology user is subject to strict liability, her incentives are highly affected by miscalculations in calculating damages. In the example just discussed, distortions would likely occur in user care under such a liability rule. The patentee avoids liability only by conforming to the reasonable care standard. As a result, the user assumes the patentee takes such care, and that she will be held strictly liable. Thus, her options are to take 0 hour care (for \$30), 1 hour care (for \$25), or two hours care (for \$24). She will minimize her costs by taking two hours care, even though this is higher than optimal. Meanwhile, if the standard of reasonable care is set incorrectly in the contributory negligence analysis, then the patentee will have an incentive to conform to that sub-optimal standard. Thus, as compared to strict liability and negligence liability, strict liability plus contributory negligence yields both types of error cost.

A negligence rule with a contributory negligence defense and a comparative negligence rule are also problematic. Compared to a simple negligence rule, which would distort the incentives for the technology user only, errors in setting the negligence standard under these rules would distort the incentives bilaterally.

4. Externalities

Until now, the analysis has assumed that the private harm suffered by the patent owner is a perfect proxy for the public harm suffered when an accidental infringement occurs. However, frequently this is not the case. Often inventions come with significant positive externalities (or spillovers) which cannot be captured by the patent monopoly.¹⁹² For example, imagine in our scenario in Table 2, the patent at issue is a drug which alleviates the symptoms of the common cold. The patent enables the inventor to charge producers of the drug \$100. However, frequent use of the medicine by people in society may have the further benefit of reducing the spread of the cold virus (due to less frequent coughing and sneezing). Thus, the value to society that accompanies the production of the drug may be higher than the patentee's private value, e.g. \$200. In order for society to minimize the cost of accidents, the user must take cost-justified care, taking into account the cost of the precautions and the expected accident costs. But the expected accident costs must reflect the social loss that would accompany the patent accident, not merely the private loss caused to the patentee.

Similarly, we have so far assumed that the utility the user receives from production of her product is a perfect proxy for the public good associated with the user's technical activity. Once again, this is not necessarily the case. The technical activity of the user may provide significant positive externalities beyond that captured in the user's private utility. For example, if the invention is a wireless network technology, a user may create a type of cell phone employing

¹⁹¹ Theoretically it is possible for too low damages to result in distortions even under a negligence regime. It is not impossible, for example, for a technology user to prefer to select pay incorrectly low damages rather than invest in cost-justified precautionary measures, see Ariel Porat, *Misalignments in Tort Law*, 121 YALE L.J. 82, 136 (2011) (assuming when the standard of care is optimal, "injurers will be under deterred with too-low damages" but will be "optimally deterred with efficient and too-high damages."). However, this problem would seem to occur infrequently in patent law. The miscalculation of damages would need to be very significant to result in a case where the user technology user would prefer to select damages rather than take precaution. For example, take the case where the expected accident (pA) costs are \$110,000, and the defendant can take care for a cost of \$10,000 which will reduce the expected accident costs by 10%. In such a case, care is efficient as \$10,000 in care will result in a \$11,000 reduction in expected harm. Therefore, under a negligence rule, the defendant's choice is to either take care for \$10,000 or expect to pay \$110,000 in liability. If the court incorrectly sets the liability award at, e.g. \$100,000, or \$75,000, or \$50,000, the same result will occur. Only if the damages are set very significantly too low, i.e. below \$10,000 will the technology user's incentives be distorted.

¹⁹² See Frischman & Lemley, *supra* note 175.

wireless emails. The user's product may be a commercial success, yielding private utility for herself, but widespread use of this product may have even greater social benefits, because the new product enables faster communication between people in society leading to better information transfer. When seeking to minimize the social costs of accidents, the user should take cost-justified precautions taking into account the public, not merely the private, benefit produced by the user's technical activity.

However, under a strict liability rule, users will not take into account positive externalities. Take the cold medicine example to illustrate. The private harm that the user's use causes the patentee remains \$100. Thus, prior to the accident occurring, the expected accident costs, and thus the expected liability costs, are the same as those presented in Table 3. Thus, the user will still adopt 1 hour care. However, this is no longer optimal. Assuming the probability of the accident occurring remains the same, if the user takes 0 hours care, the expected accident costs are now \$30; if the user takes 1 hour care, the expected accident costs are \$20; and if the user takes 2 hours care, the expected accident costs are \$16. Thus, 0 hours care yields a social loss of 30; 1 hour care yields a total social cost of \$17; and two hours care yields a total social cost of \$10. Accordingly, taking a second hour of care would be cost justified and minimize society's total social cost. Nevertheless, the user will not take this optimal level because the court has not considered the public harm caused by the infringement.

One way to rectify this problem would be for the court to alter the liability award to reflect the public harm rather than the merely private harm.¹⁹³ But there are significant practical obstacles to doing so. Patent infringement usually results in a compensatory damage award, where the remedy seeks to redress the private harm.¹⁹⁴ Altering this would require the court to provide a supra-compensatory remedy. This leads to a "windfall" problem i.e. the patentee receives more damages through a court-imposed remedy than the patent allows her to get on the open market through licensing.¹⁹⁵ The patentee thus has an incentive to sue for damages rather than license the technology. If reducing accident costs is the goal, it is counter-intuitive at best to provide patentees with an incentive not to license the invention, but instead to prefer for damages once an accidental infringement occurs. Unless the patent right could be altered in some way to enable the rights holder to capture the full social value of the invention (a suggestion itself of dubious value),¹⁹⁶ then avoiding perverse incentives would require avoiding higher damage awards.

On the other hand, a negligence rule can be adjusted to reflect externalities, and thus incentivize the user to take such external cost into account. If the patented invention produces substantial positive externalities, then the court can take this into account when assessing the harm caused by the accidental infringement. As a result, the user would be required to take a greater level of care in order to avoid liability. Alternatively, if the user's own activities involve substantial positive externalities, the court can increase the cost of the precaution in the reasonable care standard to reflect this value; once again the user would conform to this appropriate standard.

However, a negligence standard will not encourage the patentee to take appropriate care, taking into account positive externalities. Assuming the user conforms to the standard of care, the patentee only bears the private costs of the accident (her private care costs and the private expected accident costs) and not the public costs of the accident, (the private cost of preventing the accident plus the public expected accident costs). As a result, the patentee will select a level of care that minimizes the private cost of the patent accident but not necessarily the public cost. Both a negligence rule with a contributory negligence defense and a comparative negligence rule

¹⁹³ One interesting example of such damages recalibration can be found in William Lee and A. Douglas Melamed, *Breaking the Vicious Cycle of Patent Damages*, 101 CORNELL L REV, 385 (2016) (arguing that damages need to be reformed in various ways because of the inability in many fields to preclear patents). As a result of this, and similar proposals on patent damage reforms, see e.g. Golden, *supra* note 00, this Article is assuming that courts are capable of adjusting damages roughly in proportion to the positive externality. An alternative assumption and analysis was made in Bracha & Goold's work on *Copyright Accidents*, *supra* note 17 at 1051-56.

¹⁹⁴ See e.g. 35U.S.C. §284 ("the court shall award . . . damages adequate to compensate for the infringement . . . in no event less than a reasonable royalty for the use made of the invention by the infringer . . ."). For criticism, see Ted Sichleman, *Purging Patent Law of 'Private Law' Remedies*, 92 TEX. L. REV. 516 (2014). See also John, *Principles for Patent Remedies* 86 TEX. L REV 505 (2010).

¹⁹⁵ See generally Note, *An Economic Analysis of the Plaintiff's Windfall From Punitive Damage Litigation*, 105 HARV. L. REV. 1900 (1992).

¹⁹⁶ See Mark A. Lemley, *Property, Intellectual Property, and Free Riding*, 83 TEX. L. REV. 1031 (2005).

has the same unfortunate outcome.

Strict liability with a contributory negligence defense is arguably the best rule for internalizing third-party externalities. The patentee must take reasonable care to avoid being held contributorily negligent. The standard of reasonable care can be adjusted to reflect public externalities caused by the patented invention (the cost of care are increased) or on the user's side (the cost of precaution is increased). Assuming the patentee takes due care, the user is then held strictly liable, and the damages can be changed to reflect either the value of the user's or the patentee's technical activity for society. Unlike a simple strict liability rule, however, this does not yield a windfall problem. In order to receive a liability award, the patentee must take reasonable care to avoid the accident. Thus, if a patentee were to take less than optimal care in the hope of claiming large damage awards, they would receive no damage award at all.

D. Summary

Table 6 summarizes the discussion from Sections B and C. Analyzing the table reveals not only that some form of negligence rule is preferable to a strict liability rule, but also that the optimal liability rule is either a simple negligence rule, or a strict liability rule with a contributory negligence defense. After discussing these options, this Section concludes with some additional considerations that, in this author's view, tip the scales in favor of a simple negligence rule.

Table 6: A summary of primary and secondary considerations

	User Care	Patent Owner Care	Externalities Internalized	Administrative Cost	Error Cost
No Liability	Not Optimal	Optimal	No	None	None
Strict Liability	Optimal	Not Optimal	User Internalizes	Moderate	Moderate
Simple Negligence	Optimal	Optimal	User Internalizes	Moderate	Moderate
Strict Liability + Contributory Negligence	Optimal	Optimal	Owner + User Internalizes	Moderate	High
Negligence + Contributory Negligence	Optimal	Optimal	User Internalizes	High	High
Comparative Negligence	Optimal	Optimal	User Internalizes	High	High

Some version of a negligence liability rule is preferable to either a strict liability or no liability rule because such a rule generates incentives for bilateral care. As this is the primary consideration and most important value, strict liability and no liability can easily be rejected as inappropriate liability rules. On the other hand, both comparative negligence and negligence with a contributory negligence defense also provide incentives for bilateral care, but each come with high error and administrative costs; these two liability rules can therefore be easily rejected because of the secondary considerations.

The best option is therefore either a simple negligence rule or a strict liability plus contributory negligence defense liability rule. Both of these rules encourage the technology user and the patent owner to take cost-justified precautions to avoid the accident occurring, and thus are likely to limit social cost. On the most important criterion, these rules perform equally well.

It is therefore down to secondary considerations to help determine which rule is preferable. However, the secondary considerations do not provide a clear winner. The most important secondary consideration, activity levels, is unhelpful in this context, as the activities of both the patent owner and the technology user affect the probability of accidental infringement approximately equally. The remaining secondary considerations cut in different directions: while a strict liability plus contributory negligence rule involves higher error costs than negligence rule, such a rule also seems better placed to internalize third party positive externalities associated with the technical activity.

Although both rules have a legitimate claim to optimality, three additional considerations tip the scales in favor of a simple negligence rule. First, from the discussion in part II, it emerged that the contemporary patent accidents problem is caused significantly by patent owners taking less than optimal care. As the discussion of “notice failure” highlighted, the current patent system does not provide sufficient incentives for the patentee to provide full ownership information to the public.¹⁹⁷ On the other hand, there is very little suggestion that the patent accident problem is the result of users taking less than optimal care.¹⁹⁸ Therefore, while an optimal liability rule ought to ensure both parties have the right incentives, there is reason to believe that increasing the incentives for the patent owner is comparatively the most important goal. A simple negligence rule is preferable to strict liability plus contributory negligence rule from this perspective. Crucially, a simple negligence rule makes the *patent owner* the residual bearer of the harm, whereas strict liability plus contributory negligence makes the *user* the residual bearer of the harm. As a result, under a strict liability rule with contributory negligence defense, the patentee will only take the precautions necessary to conform to the due care standard. Under a negligence rule, the patentee will internalize the value of any *additional* cost-effective precautions that are not accounted for in the negligence standard (such as activity levels or any other non-foreseen variables). This is desirable in the contemporary environment where the patentee’s lack of incentives for care are a comparatively significant contributor to the accident problem.

Second, a negligence rule is preferable in situations where the patentee and user select their levels of care sequentially.¹⁹⁹ In many situations, the patentee has the opportunity to select the level of care before the technology user. The patentee has the opportunity to decide whether to attach markings to a product, and in what form, and how to write the patent specification. Only later does the user decide how much time they will invest in searching for the patentee. Under a strict liability plus contributory negligence rule, this may lead to less than optimal incentives for the user. If the patentee is contributorily negligent and if the user can see this *ex ante*, then the user may fail to take reasonable care (knowing that any accidents which do occur will be attributed to the patentee’s carelessness). For example, if a patentee fails to attach notice to a product, a user, upon inspecting the product, may decide not to spend any further time searching for the patentee, even though doing so would help reduce accident costs, because the user accurately predicts that, if they do infringe a patent, they will not be held liable on account of the patentee’s contributory negligence. On the other hand, under a negligence rule, the user would still have the incentive to conform to the due care standard.

The third concern is litigation costs. So far, we have assumed that the strict liability and negligence rules lead to moderate administrative costs because while strict liability is easier for

¹⁹⁷ *Supra* notes 85-88.

¹⁹⁸ Some anecdotal evidence to the contrary suggests that some firms instruct their employees not to read patents, in the hope of avoiding intentional infringement of patents, although doing so increases the risk of accidental infringement. See, e.g., Edwin H. Taylor & Glenn E. Von Tersch, *A Proposal to Shore Up the Foundations of Patent Law that the Underwater Line Eroded*, 20 HASTINGS COMMS & ENT L.J. 721, 737 (1998) (“As matters now stand many companies discourage employees from reading patents. This presumably lessens the chance that the company will be found to have knowledge of a patent. However, this defeats the basic purpose of the patents [sic] laws, dissemination of information.”); However, unlike the scale of the problems presented by notice failure, which are empirically well-documented, see Bessen & Meurer, *supra* note 8, the scale of the problem of such deliberate shielding is not empirically well-grounded. Furthermore, under a negligence rule, the incentives for such behavior may be limited. Rather than instruct employees to refrain from reading patents, companies would be better served by employees being aware of neighboring patents and taking reasonable precautions to avoid infringement, as this would provide a complete defense.

¹⁹⁹ On sequential decision making to the choice of liability rule, see Landes & Posner, *supra* note 159, at 76-77, and Shavell, *supra* note 34, at 15 n.14.

judges to apply than a negligence rule, the strict liability rule leads to more infringement cases which need to be resolved. However, we have also explored the possibility that limiting the overall volume of patent infringement cases would minimize costs, even if the complexity of some litigation would increase.²⁰⁰ Extending that line of analysis further, my hunch is that a simple negligence rule would not only be less costly than a strict liability rule, but would also be less costly than a strict liability rule accompanied by a contributory negligence defense. This suspicion flows from a problem of information asymmetries. If a simple negligence rule is imposed, users can avoid litigation (or alternative dispute resolution) by responding to infringement allegations simply by stating what level of care they have taken. However, users do not have the same option necessarily under a strict liability plus contributory negligence rule. In many cases, users will not know what level of care the patentee has taken (especially if the patentee's level of search was negligent). Often this information will only come out into the open at trial. As a result, without this information, many users will need to go to trial to establish the contributory negligence defense, whereas they would not need to do so to prove their lack of negligence. If this is true in a substantial amount of cases, administrative costs would be lowest if a simple negligence rule were to be adopted.

IV. Implementing Negligence

Part III demonstrated that either a simple negligence rule or a strict liability rule accompanied by a contributory negligence defense minimizes the social loss associated with patent accidents. Furthermore, Part III concluded with a number of reasons for preferring a simple negligence rule. This Part accordingly turns to issues of implementation. Section A examines two legal regimes in more detail – the U.S. and U.K. – and asks: How closely do these current legal regimes approximate the ideal liability rule? It demonstrates that the U.K. regime comes closer to the ideal regime because U.K. law denies damages in cases where the defendant did not know nor had “reasonable grounds” for supposing that the patent existed.²⁰¹ Armed with these insights, Section B proposes a “patent negligence” defense. In accident cases, defendants ought not be held liable when they have taken reasonable care to avoid the accidental infringement. Section C illustrates how this rule would apply to a range of accidental infringement cases.

A. Existing Legal Regimes

We shall first turn our attention to U.S. patent law (which may be described as a “quasi-contributory negligence regime”), and thereafter to U.K. patent law (which may be described as a “quasi-negligence regime”).

1. U.S. Patent Act

Under current U.S. law, one who accidentally infringes a patent will be held strictly liable. Typically, the patent holder is awarded damages and an injunction.²⁰² However, there is an exception in Section 287 of the Patent Act.²⁰³ This section states that “patentees, and persons making, offering for sale, or selling within the United States any patented article” may give notice to the public of the patent by attaching the word “patent” and the patent number; if such marking is not given, then the patent holder will not receive damages unless they have given the infringer actual notice (but will still receive an injunction).²⁰⁴ The purpose of this marking requirement was introduced to reduce the frequency of inadvertent patent infringement.²⁰⁵

However, the marking requirement has been interpreted narrowly by courts.²⁰⁶ In

²⁰⁰ *Supra* note 180-81 and accompanying text.

²⁰¹ *See infra* notes 219-221.

²⁰² 35 USC 283-4.

²⁰³ 35 USC 287.

²⁰⁴ 35 U.S.C. §287.

²⁰⁵ *Wine Ry. Appliances Co. v. Enterprise Ry. Equip. Co.*, 297 U.S. 387, 398 (1926) (the purpose of patent marking is to provide “protection against deception by unmarked patented articles, and requires nothing unreasonable of patentees”); *Motorola, Inc. v. United States v.* 729 F.2d 735, 772 (Fed. Cir. 1984) (“a fundamental rationale supporting section 287 is supplying notice to prevent innocent infringement.”). *Bandag, Inc. v. Gerrard tire co.*, 704, f.2D 1578, 1581 (Fed. Cir. 1983) ([t]he purpose of this provision is to give patentees the proper incentive to mark their products and thus place the world on notice of the existence of the patent.”).

²⁰⁶ *See Blair & Cotter, supra* note 12, at 840-45; *Chiang, supra* note 11, at 43-9.

particular, the requirement only applies in cases where the patentee produces *products*.²⁰⁷ As a result, the marking “duty” does not apply in cases where the patentee does not produce a product. Therefore, as interpreted by courts, there is no duty to mark nor give notice in cases where the patent covers a process rather than a product.²⁰⁸ Furthermore, there is no marking duty in cases of idle or non-commercialized patents (that is, patents relating to products, but where the patent holder does not commercially market any products).²⁰⁹ These types of patents – both process and idle patents – are particularly relevant in the context of patent assertion entities (or patent “trolls”). Patent assertion entities by definition do not produce any products, and therefore are under no marking duty; their revenue instead flows from licensing the patented technology. In these cases, there is currently no marking duty, and accordingly this business model encourages patent accidents.

How does the U.S. liability regime compare to the ideal negligence rule? To answer this, it is helpful to split the cases into two groups: those where the marking duty does not apply, and those where the marking duty does apply. In the former, the liability regime is a straightforward strict liability rule: damages and injunctions are awarded regardless of the level of care either party has taken to prevent the accidents occurring. On the other hand, in cases where the marking duty applies, the liability rule comes close to a strict liability rule accompanied by a contributory negligence defense. That is, the user will be liable unless she can demonstrate that the patentee was contributorily negligent in failing to provide appropriate notice.

Nevertheless, there are two ways in which the current liability regime governing cases where the marking duty applies differs from that of a standard contributory negligence rule. First, the contributory negligence defense is implemented using rules rather than standards. Legal theory demonstrates how the same legal directive can be implemented in a variety of more or less precise ways.²¹⁰ For example, in order to encourage drivers to drive at a reasonable speed, a legal rule could be drafted using a vague and flexible standard (i.e. drivers must drive “reasonably”), or alternatively, a more precise and more rigid rule could be adopted (i.e. drivers must drive under 30mph). The benefits and costs of each regime are discussed in detail in a voluminous literature.²¹¹ Typically, when legal scholars discuss contributory negligence, they make reference to a contributory negligence rule drafted using standards (i.e. the defendant will be liable unless the plaintiff failed to take “reasonable care”). However, in Section 287, the contributory negligence standard is not drafted using a vague and flexible standard, but instead using a bright line rule: the patentee will be contributorily negligent if she failed to appropriately mark the product or provide the user with actual notice.²¹²

Second, and more significantly, even if the plaintiff is contributorily negligent, they may still be awarded an injunction. This is unusual for a negligence rule. As Calabresi and Melamed demonstrated, “property rules” (i.e. entitlements protected by injunctive relief) are appropriate in cases where the parties can bargain *ex ante*.²¹³ This allows the market to allocate goods to the actors that value them the most. However, where transaction costs prevent *ex ante* bargaining, then a liability rule ought to be imposed, i.e. injunctive relief ought to be denied and damages imposed.²¹⁴ The question thereafter becomes *what type* of liability rule ought to be imposed: strict liability or some form of negligence liability rule? As highlighted by others previously, patent accidents involve cases where *ex ante* bargaining cannot take place, and therefore a property rule is unhelpful, and a liability rule ought to be imposed.²¹⁵ This current Article is concerned with the next step of the analysis and suggests a negligence rule is preferable to a strict liability rule. However, the current Section 287 rule is a hybrid in that it denies damages when the patentee was

²⁰⁷ *Wine Ry. Appliances Co.*, 297 U.S. 387, 398.

²⁰⁸ *Supra* note 206.

²⁰⁹ *Id.*

²¹⁰ See generally, Louis Kaplow, *Rules Versus Standards: An Economic Analysis*, 42 DUKE L.J. 557, (1992); Isaac Ehrlich & Richard A. Posner, *An Economic Analysis of Legal Rulemaking*, 3 J. LEGAL STUD. 257 (1974).

²¹¹ *Id.*

²¹² *Id.*

²¹³ Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089 (1972).

²¹⁴ *Id.* at 1105-10.

²¹⁵ *Supra* note 15.

contributorily negligent, but nevertheless allows the patentee to receive an injunction.

Presumably, this difference can be explained on the grounds that after a court has found infringement, the transaction costs between the user and the patentee are reduced: the user now knows whom to contact to license the technology.²¹⁶ Therefore, while the court should impose a negligence liability rule for past conduct, future conduct ought to be treated as non-accidental and thus governed by a property rule to encourage effective market transactions.

Yet this reasoning leaves much to be desired. In many instances, injunctive relief will lead to a “hold-up” problem.²¹⁷ Frequently by this point, the technology user will have built a business around the use of the technology, and therefore not be in a position to easily carry on business without it. There is a substantial chance that technology users who become accidental infringers will become “locked in” and be unable to change their business to avoid the patent infringement. In such circumstances, injunctive relief allows the patentee to shut the user’s business down, unless the user pays a very high licensing fee (i.e. above the rate that the user would have paid if they had truly bargained *ex ante*). To illustrate, in the *RIM v NTP* case, NTP’s injunctive relief enabled them to extract a \$613 million license fee from RIM.²¹⁸ The potential for receiving a highly lucrative injunction in turn distorts the incentives for patentee care: by taking less than optimal care, they may lose the possibility of obtaining damages, but may increase their ability to receive an injunction which may be even more profitable. Thus the presence of *ex post* injunctions threatens the very goal the law should achieve, i.e. that both parties take an appropriate level of care to prevent accidents *ex ante*.

2. U.K. Patent Act

Like the U.S., liability for accidental infringement in the U.K. is imposed strictly. But also like the U.S., damages will be refused in some cases. Section 62 of the Patent Act 1977 states that no damages will be awarded against a defendant who was not aware of the infringement “and had no reasonable grounds for supposing” that the patent existed.²¹⁹ If a patented product contains the word “patent” and the relevant patent number, then the user shall be deemed to have reasonable grounds for supposing the patent existed.²²⁰ Courts have held that the “reasonable grounds” test is objective, and in many cases compared it to the “reasonable person” negligence standard.²²¹

Recent cases illustrate the rule’s scope. In *Collingwood Lightning Ltd v Aurora*²²², the patentee produced a fire-resistant LED downlight. The defendants alleged they had no grounds to know of the patent, but the court disagreed: the patented product had been featured in a trade magazine (as the magazine’s “Innovative Product of the Year”) with wide circulation, and which was frequently read by the defendant’s technical staff.²²³

In contrast, the defense was successfully argued in *Micromatic A/S*.²²⁴ In this case, the claimant produced a patented valve coupling to stop valves in pressurized containers (e.g. beer kegs) from “shooting out” when removed.²²⁵ Crucial to the functioning of the invention was a “lower pin”.²²⁶ However, the patent did not explain the function of this lower pin.²²⁷ After the function of the lower pin was established at trial, the court held that the patent was invalid for lack of novelty and inventive step.²²⁸ But the court went one step further and stated that had it

²¹⁶ This reasoning was implicit in the *Monsanto Canada Inc. v. Schmeiser* [2004] 1 S.C.R. 902 case, where the court focused not on the initial potentially accidental infringement, but instead on what actions Schmeiser ought to have taken *after* having found the patented seeds on his farm land.

²¹⁷ See generally, Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 Tex. L. Rev. 1991 (2007).

²¹⁸ *Supra* note 5.

²¹⁹ Patent Act 1977, s.62

²²⁰ *Id.*

²²¹ See e.g. *Schenck Rotec GmbH v Universal Balancing Ltd* [2012] EWHC 1920 (Pat) (“The facts known to Universal Balancing at the time were not such that would lead a reasonable person to think the patent existed.”).

²²² [2014] EWHC 228 (Pat).

²²³ *Id.*

²²⁴ [2001] 5 WLUK 209 (Ch D (Patents Ct))

²²⁵ *Id.*

²²⁶ *Id.*

²²⁷ *Id.*

²²⁸ *Id.*

found the patent valid, it would nevertheless have not awarded damages because, in not explaining the functioning of the lower pin, the patent was not drafted with “reasonable skill and knowledge” and thus the defendants had no reasonable grounds for supposing they infringed the patent.²²⁹

Finally, in *Schenck Rotec v Universal Balancing*, the plaintiff produced a device and a method for fixing balancing weights to a rotor.²³⁰ The defendant was a competitor in the market.²³¹ The claimant alleged infringement in 2010 and the defendant claimed Section 62 applied.²³² Schenck argued that the defendant ought to have performed a search of the patent register; they argued that there were only four significant players in the propshaft balancing industry and that all other incumbents patented their inventions. However, the judge disagreed.²³³ The judge found that the “possibility for new developments in this field is limited”²³⁴, and that the defendant had not seen the patentee’s brochures or literature describing their product as “patented”.²³⁵ As a result, the court found that the facts known to the defendant “at the time were not such that would lead to a reasonable person to think the patent existed” and nor “would these facts lead a reasonable person to think they should conduct patent searches” to see if their product infringed a competitor’s patents.²³⁶

The U.K. provision is best described as a “quasi-negligence” rule where the burden of proof is on the defendant to prove their lack of negligence. Unlike the U.S., courts are directed to examine the user’s level of care rather than the patentee’s. In cases where the patentee markets products, there is an additional evidentiary rule: if the patentee attached appropriately notice the court may infer the defendant behaved negligently. But, unlike the U.S. provision, the negligence rule is not limited to these cases, and accordingly, the rule is broader in scope than Section 287 of the U.S. Patent Act. The negligence rule applies to all forms of accidental patent infringement and not merely infringement of patented products. However, like the U.S. law, injunctions are still routinely awarded to restrain future activity.

In sum, both the U.K. and U.S. law already adopt some mechanisms to encourage bilateral care, and in this sense approximate some form of negligence rule. However, both legal regimes implement that negligence rule imperfectly. Armed with this insight, we can turn to reform proposals.

B. A Patent Negligence Defense

This Article recommends that countries dealing with the problem of patent accidents adopt some version of a “patent negligence” defense.²³⁷ Implementing such a rule would require courts to first determine whether the infringement was accidental or not. This would require the judge to consider the ex ante position of the defendant. If a reasonable person would have foreseen that the planned conduct would almost certainly infringe a patent, the infringement should be classed as intentional, and subject to the normal procedures (including supra-compensatory damages for willful infringement). In these cases, nothing need change. On the other hand, if the court determines that a reasonable person would only have foreseen a substantial risk that the planned conduct may amount to a patent infringement, then courts ought to apply a negligence rule. Courts in these cases should be directed to assess whether the technology user adopted all reasonable care to mitigate the risk, using the Learned Hand formula as a guide to determining whether a given precautionary measure was reasonable or not. If a defendant is deemed to have failed to take all reasonable care available, then the defendant ought to be held liable for damages. If, however, the defendant did take all reasonable care, then the defendant ought to be held not liable, and subject to neither damages nor injunction.

This proposal recommends implementing a negligence rule via legal standards rather than

²²⁹ *Id.*

²³⁰ [2012] EWHC 1920 (Pat).

²³¹ *Id.*

²³² *Id.*

²³³ *Id.*

²³⁴ *Id.* at para 223.

²³⁵ *Id.*

²³⁶ *Id.* at para 224.

²³⁷ *Cf* Ard, *supra* note 15 at 730-32 (proposing a compulsory license after reasonable search efforts).

a more precise set of rules. Courts ought to have a broad discretion to consider the whether the defendant adopted all “reasonable” precautionary measures in the circumstances. The alternative would be to define a set of precise rules which approximate the negligence determination, e.g. the defendant must be found negligent if she failed to search the patent registry. The pros and cons of such rules are well-established in the literature.²³⁸ While proxy rules provide more legal certainty, their inflexibility frequently leads to over- and under-inclusiveness.²³⁹ For example, courts could adopt a rule that any user who fails to perform a search of the patent register will be considered negligent. However, such a rule is over-inclusive: it holds liable those who fail to search when it would not be reasonable to do so (such as the defendant in *Schenck*).²⁴⁰ The rule would also be under-inclusive: some users would be held not liable for infringement on the grounds that they searched the register, even though they failed to take some alternative care measure which may have been cost-justified in the circumstances (e.g. inspecting products for patent information).

A good example of the potential for over- and under- inclusiveness in this area comes from contemporary U.S. law. Section 287 was drafted to encourage patentee care and prevent accidental infringement.²⁴¹ But it is under-inclusive in that the rule does not encourage patentee care from those who hold patents on processes or non-commercialized products, and it is over-inclusive in exempting from liability defendants who have not infringed accidentally (i.e. those who knowingly infringe but are shielded from damages because the patentee has failed to provide appropriate notice). While this over- and under-inclusivity could theoretically be resolved by creating an even more fine-grained set of rules, I am unconvinced this would be an efficient approach to legal design. As demonstrated in Part II, the situations in which accidental patent infringement occurs are highly heterogenous, and accordingly accidental infringement, like accidents in other parts of tort law, is a problem best solved by increasing judicial discretion to apply a flexible standard.²⁴²

Nevertheless, rules will still play a part in the patent negligence defense. Courts undoubtedly will over time formulate evidentiary rules that indicate when a user has behaved negligently.²⁴³ This will increase certainty incrementally to an appropriate level. A starting point should be the example in contemporary U.K. law. In cases of patented products, courts should adopt an evidentiary rule that if the patentee has attached the word “patent” and a patent number, then the defendant is presumably negligent. This, however, ought to take the form of a rebuttable presumption. If the defendant can prove that, despite the existence of the patent information marking, that they took all reasonable care, then they nevertheless ought not to be held liable.

The proposed defense is an affirmative defense. The burden of proof falls on the user to establish the defense once a *prima facie* case of infringement has been established. While clearly a change to patent doctrine, this would provide the simplest and least intrusive intervention into the existing system. Under this proposal, most patent cases would remain unaltered: in non-accident cases, patent cases would proceed as they currently do. Indeed, in many accident cases, there would be very little change: many defendants who do not have the required evidence to prove reasonable care are more likely to reach a settlement, rather than attempt defense. The only cases that would change are those in where the defendant has a plausible argument that they adopted all reasonable care.

As will be recalled from Part II.C., a number of authors raised concerns about the feasibility of adopting a negligence rule. At this point, we can see how adopting a patent negligence affirmative defense would avoid or mitigate those concerns. Blair and Cotter argue that the administrative costs of a negligence rule are too high.²⁴⁴ The first, and most important response, to this concern is that the administrative costs of strict liability are already very high: strict liability leads to large numbers of infringement claims which would not reach court under

²³⁸ *Supra* note 210.

²³⁹ *Id.*

²⁴⁰ *Supra* note 230.

²⁴¹ *Supra* note 205.

²⁴² Ehrlich & Posner, *supra* note 210, at 270 (“The problems of overinclusion and underinclusion are more serious the greater the heterogeneity (or ambiguity, or uncertainty) of the conduct intended to be affected.”).

²⁴³ Kaplow, *supra* note 210, at 577-79.

²⁴⁴ *Id.* at 821-29.

a negligence liability rule.²⁴⁵ Given the Bessen and Meurer findings on the explosion of patent litigation in recent years due to the number of infringement claims, the claim that that strict liability is administratively less costly than a negligence rule invites questions.²⁴⁶ Furthermore, not only will those administrative costs be mitigated by the doctrine of stare decisis, but these “extra” costs will only apply in a subset of patent infringement cases, namely accident cases.

Similarly, Robert Merges defends strict liability on two grounds.²⁴⁷ First, Merges argues that that proving “copying” would be costly for patent holders.²⁴⁸ But, while there is certainly truth in Merges’s concern, this Article does not make such a proposal. Instead, the Article proposes that the defendant avoid liability by proving they took reasonable care to prevent infringement. Accordingly, the legal costs for the patent holder will not be significantly altered. Secondly, Merges argues that if knowledge of the patent was a pre-condition for patent infringement, then technology users will have an incentive to shield their research staff from technology subject to a patent, in order to avoid those researchers from copying patented material.²⁴⁹ However, in the vast majority of cases, shielding researchers will not qualify as a “reasonable” precautionary measure. Indeed, as Merges highlights, the costs of shielding in terms of lost knowledge transfer will be great, and the benefits in terms of reduced accident prevention will often be slight.²⁵⁰ Accordingly, a defendant who fails to adopt such shielding tactics would not be deemed negligent. As a result, innovative companies would not have an incentive to take such inefficient measures.

By far the best way for such a rule to be implemented would be through legislation. Ideally the legislator ought to enact a provision stating that in cases of accidental infringement, the defendant will be subject to compensatory damages and an injunction if she has failed to take all reasonable care. The legislation should then further define an infringement as accidental if, prior to performing the technical activity, the defendant could not establish with reasonable certainty whether the technical activity would be infringing behavior or not. The legislation should also establish the Hand Formula as the test for whether a precautionary measure is reasonable or not. In the U.S. an ideal place for this defense would be Section 271 of the Patent Act, which currently defines infringement (proposed subsection i.).²⁵¹ Likewise, in the U.K. Section 62 (on the “Meaning of Infringement”) would serve as an appropriate destination.²⁵²

Alternatively, courts could also take the lead implementing a negligence rule. In the U.K., this would require only a modest change in practice. The law already directs the court to deny damages in cases where the defendant behaved reasonably.²⁵³ The only additional step required would be for courts to deny injunctions in the same cases. Currently, while routinely awarded, injunctions will be denied in certain cases, such as where the injunction would be oppressive on the defendant.²⁵⁴ In cases where the defendant could not be certain of the infringement *ex ante*, and has taken the care of a reasonable person in ascertaining the status of the technology, it would be oppressive to award an injunction and thereby threaten to shut down a socially desirable business. Moreover, article 3(2) of the EU Enforcement Directive requires that remedial measures be imposed on the basis of their proportionality, amongst other things.²⁵⁵ Denying the injunction in such cases would arguably be proportional to the user’s level of culpability.

In the U.S., courts would need to adopt a more interventionist approach. Unlike the U.K., in many cases, the liability standard in the U.S. is strict, and only in some cases is a contributory negligence defense partially adopted.²⁵⁶ Yet, the Patent Act does not at any point state that the

²⁴⁵ *Supra* note 178-81 and accompanying text.

²⁴⁶ *Id.*

²⁴⁷ *Supra* note 108-115.

²⁴⁸ *Id.*

²⁴⁹ *Id.*

²⁵⁰ *Id.*

²⁵¹ 35 U.S.C. §271.

²⁵² Patent Act 1977, s.62.

²⁵³ *Id.*

²⁵⁴ *Sterwin v Brocades* [1979] RPC 281; *Navitarire Inc. v. EasyJet Airline Co Ltd* (No 2) [2006] RPC (4) 213.

²⁵⁵ Directive 2004/48.

²⁵⁶ *Supra* note 207-10 and accompanying text.

liability for patents must be strict.²⁵⁷ The question of fault in patent law has long been a judicial decision. Lynda J. Oswald demonstrates in her history of patent infringement that U.S. courts adopted strict liability for patent infringement in the nineteenth century.²⁵⁸ Courts and early treatise writers argued that patents were a form of property and imported concepts into patent from property law, including the strict liability infringement rule.²⁵⁹ This rule was upheld by the U.S. Supreme Court in *Hogg v Emerson* in 1850 and has remained part of patent law ever since.²⁶⁰ When Congress revised statutory patent law, there was little questioning of whether accidental infringement ought to be strict or fault-based.²⁶¹ Courts today retain the authority to modify this judicially-created rule. Both the U.S. Supreme Court and the Federal Circuit have the authority to hold that a defendant only be held liable for negligent accidental infringements of patent rights. Therefore, in the absence of Congressional action, courts could find that in accidental infringement cases, a defendant who proves that she has taken all reasonable care, is not within the definition of an infringer, and thus not liable. Section 287 would thereafter layer over this basic liability rule. The underlying liability rule would be negligence, and Section 287 would provide an evidentiary rule that, in cases of products, a defendant is taken to be liable if the patentee attached appropriate marking to the product.

C. Illustrative Applications

Having proposed the introduction of a “patent negligence” defense, this Section considers how such a defense would apply in certain high profile accident cases. In particular, the cases of *NTP v RIM*, *Rambus v Infineon*, and *Monsanto v Schmeiser* will be examined. These cases are selected because together they illustrate how the negligence rule would apply to a number of areas of contemporary concern in patent law: patent thickets, patent trolls, strategic behavior, and self-replicating technologies. The analysis shows how these are not isolated problems facing the patent system, but instead are the emanations of a deeper, more significant, accident crisis that remains unaddressed.

1. *NTP v RIM*: Patent Thickets and Patent Trolls

As previously highlighted, the NTP case is illustrative of the problems caused by patent thickets, particularly in the smartphone sector, and is further interesting because the plaintiff was a non-practicing entity.²⁶² How would such a case be analyzed under this Article’s proposed negligence rule? To answer that question we must ask: Did RIM take all reasonable measures to avoid the infringement? In other words, did RIM behave negligently? Or were there any precautionary measures that NTP could have adopted which would have helped avoid this particular accident? The following section tentatively sketches the argument that RIM did not behave negligently. However, this conclusion is tentative. As will be seen, whether RIM behaved without due care is a difficult question, with finely balanced arguments on either side.

What precautionary measures were available to RIM to prevent the Blackberry’s infringement of NTPs patents? One obvious precautionary measure would be to complete a search of the patent register. Under normal circumstances searching the patent register is a reasonable precautionary measure and one we would expect technology users to perform. In most cases, the benefit of searching the register will far outweigh the cost doing so imposes: the reduction in expected accident costs will often be great compared to a relatively modest cost. From my investigation into the case, I cannot find evidence that RIM did in fact perform a patent search. Assuming that they did not, then we normally would conclude that RIM failed to take all reasonable precautions for preventing the accident.

However, the RIM case is not an ordinary one. In this case, it is conceivable that

²⁵⁷ Indeed, as Oswald points out, no U.S. patent legislation in the past two centuries uses such language. See Oswald, *supra* note 28, at 3.

²⁵⁸ Oswald, *supra* note 28 at 3.

²⁵⁹ *Id.*

²⁶⁰ *Hogg v. Emerson*, 52 U.S. 587. 607-08 (1850).

²⁶¹ Oswald, *supra* note 28 at 1031-21.

²⁶² *NTP, Inc. v. Research in Motion, Ltd.* 270 F. Supp. 2d 751 (D. Va. 2003). For examples of other solutions designed to mitigate perceived consequences of non-practicing entities, see e.g. Oskar Liivak & Eduardo M. Peñalver, *The Right Not to Use in Property and Patent Law*, 98 CORNELL L. REV. 1437 (2013).

performing a patent search would have been largely ineffective due to the existence of a patent thicket. As highlighted earlier, the smartphone sector is one which suffers heavily from the existence of multiple overlapping patents.²⁶³ Accordingly, the ability for RIM to find all of the relevant patents through searching the register would have been very low indeed. If RIM attempted to find all the relevant patents, it would require a very significant amount of investment of time and labor into the searching process. Before RIM produced the Blackberry, therefore, their option was to perform a costly patent search that was likely to yield little marginal benefit in terms of reduction in expected accident costs (as demonstrated by the fact that when the USPTO searched the register during RIM's later patent application, it too did not uncover NTP's patent). This may explain why RIM seemingly did not perform the search. As we have seen, under a strict liability rule, the user has an incentive to take cost-justified precautionary measures. This precautionary measure was arguably not cost-justified and thus it is little surprise it was not taken.²⁶⁴ Accordingly, Bessen and Meurer conclude that it was likely inefficient for RIM to perform such a search.²⁶⁵

Was searching the register the only possible precautionary measure? Perhaps not. In January 2000, NTP sent RIM a letter explaining their belief that RIM were infringing their technology.²⁶⁶ This arrived 16 months before NTP initiated a patent infringement suit in Virginia.²⁶⁷ How ought a reasonable company respond to such a letter? Upon receiving an infringement notice, it is arguable that a reasonable precautionary measure would be to hire patent attorneys to analyze the claims made by the patent holder, and determine whether there was indeed any infringement. It is not clear, however, whether RIM adopted such measures. At trial, some evidence was introduced to suggest that RIM had carefully considered the claims; while other evidence was presented that RIM ignored the letter.²⁶⁸ Assuming the letter was ignored, was that evidence that RIM failed to take all reasonable precautions? Perhaps. Although the argument could also be made that such letter arrived *after* RIM had commenced the patent infringement. By this point, the Blackberry device was being sold commercially. It is conceivable that analyzing the claims made in the letter would have imposed a cost on RIM which, due to the timing of the letter, would not have helped prevent the infringement in the first instance.

On the other hand, what, if anything could NTP have done to prevent the infringement? Most importantly, NTP could have informed RIM of their patents before RIM started selling the Blackberry. To demonstrate this point, we need some context surrounding the introduction of the Blackberry. From 1995 to 1999, there were only a handful of producers selling pagers incorporating wireless technology: Motorola, US Robotics, Nokia, and RIM.²⁶⁹ After becoming a publicly traded company on the Toronto Stock Exchange in 1997,²⁷⁰ RIM entered this market with the production of the Inter@ctive 900 two-way Pager which allowed users to send and receive messages over the internet via a wireless data network known as Mobitex.²⁷¹ This product was commercially successful, and in 1997 was named the Top Product by "Wireless for the Corporate User" magazine.²⁷² This was just one in a string of high publicity awards. Between

²⁶³ *Supra* note 79-80 and accompanying text.

²⁶⁴ An interesting comparison can be made between the RIM case and the British *Schenck* case discussed earlier, *supra* note 230, and accompanying text. In *Schenck* it was concluded that there was no evidence that would lead a reasonable person to think they should conclude a patent search, and thus search was not considered a reasonable measure to take. It is plausible that RIM's actions were similarly reasonable.

²⁶⁵ Bessen & Meurer, *supra* note 8, at 50 ("The costs of sorting through a large number of uncertain property rights is larger than the expected cost incurred when any one patent is asserted against the innovator. We cannot be sure, but we would not be surprised if RIM's failure to do a patent search was, at the time, the best business decision available to the company.")

²⁶⁶ *NTP, Inc.* 270 F. Supp. 2d 751, at 755.

²⁶⁷ *Id.*

²⁶⁸ *Id.* at 755-58 (discussing the sufficiency of RIM's investigation and the conflicting testimony presented).

²⁶⁹ McNish & Silcoff, *supra* note 1, at 44. As a result, this situation squarely falls within the fact pattern that Chiang identified wherein it is easier for patentees to search for producers than vice versa, *supra* note 11.

²⁷⁰ Research in Motion, History, available at http://www.blackberry.com/select/get_the_facts/pdfs/rim/rim_history.pdf

²⁷¹ *Id.* at 45.

²⁷² See Press Release, *Research in Motion Increases Contract with RAM Mobile Data to \$90 Million* (Jan 7, 1998) available at https://web.archive.org/web/20070928101543/http://www.rim.net/news/press/1998/pr-07_01_1998.shtml.

1997 and 1999 RIM won awards for Excellence in Innovation from the Network Computing Magazine, was voted High Technology Entrepreneur of the Year by the Canadian Advanced Technology Association, received the Editor's Choice Award by CNET, the Mobility Award for Mobile insights from the Smithsonian, to name just a few.²⁷³ During the same time RIM had signed wireless handheld supply contracts with American Mobile, IBM, and Rogers Cantel (now AT&T).²⁷⁴ The two-way Pager was so successful that by 1998 RIM were concerned about copycats producing similar pagers, and accordingly applied for a patent on their wireless technology.²⁷⁵ By 1999, the Blackberry was introduced and was already a heavily publicized and established product: Business Week called it the close to perfect pocket email, while celebrities such as Bill Gates and Pamela Anderson were already adopting it and promoting it.²⁷⁶

In these circumstances, it would have been reasonable for NTP to inform RIM of their patents at an earlier date. NTP was a patent assertion entity, with a very limited number of patents related to wireless technology. A reasonable patent holder in these circumstances should consider who in the industry may potentially be using their patented technology, and take simple measures to ensure that those potential users do not become accidental infringers – especially when, in areas affected by patent thickets, it is unreasonable to expect the patent register alone to fulfil this task. In this case, NTP only had to keep track of a handful of companies who were potentially infringing their patents: those few companies endeavoring to produce wireless email pagers. These companies, and RIM in particular, were not hidden from public view. Rather, as the proceeding discussion shows, their wireless pagers were very well publicized, and discussed in magazines dedicated to wireless technology. In these circumstances, if NTP adopted a little more care in monitoring the market and keeping wireless technology producers aware of their patent rights, then we would expect to a reduction in the chances of a patent accident occurring. If RIM were exculpated from liability, NTP and those similarly situated in the future, would have a clear incentive to take these precautionary measures.

The conclusion that RIM was not negligent is, however, tentative. Clearly more knowledge of the case facts would be necessary to come to a final conclusion. Under the current strict liability rule, the court is not obligated to assess the level of care taken by the parties. As a result, the court record in the RIM case does not clearly demonstrate the level of care RIM adopted nor the variables necessary to determining whether such care was reasonable. Therefore, it is possible that the defendant's level of care was unreasonable. This is particularly true in relation to RIM's failure to search the patent register. If so, then the defendant did indeed behave negligently and ought to be subject to a damages award (but not injunction).

Crucially however, even if RIM was found to be liable under a negligence rule, this would still help create incentives for bilateral care. In the future, parties in RIM's situation could avoid damages by performing a reasonable patent search. Meanwhile, parties in NTP's situation would also take precautionary measures: perceiving the likelihood that most users will perform a patent search and thus be found non-negligent, the patentee will increase their chances of revenue by making their ownership information more readily apparent to users.

2. *Rambus v Infineon*: Strategic Behavior

As discussed earlier, patentees can often “benefit from strategically hiding, obfuscating, and distorting” information contained in the patent.²⁷⁷ We discussed the *Rambus* case as an example. In this case, Rambus waited until Infineon was “locked in” to using a standards-essential patent, before seeking and enforcing new patent claims.²⁷⁸ Only when Infineon adopted the SDRAM technological standard did Rambus disclose their new patent claims and bring an infringement action.²⁷⁹

Did Infineon behave negligently? The answer is almost certainly no! Infineon was an

²⁷³ Research in Motion, History, *supra* note 270.

²⁷⁴ *Id.*

²⁷⁵ *Pager Maker Gets Patent for E-Mail Delivery*, Wall St. Journal (May 18, 20019) (describing the need for patent protection to prevent “Blackberry knockoffs.”).

²⁷⁶ McNish & Silcoff, *supra* note 1, at 75.

²⁷⁷ Menell & Meurer, *supra* note 85, at 93.

²⁷⁸ *Supra* notes 48-57.

²⁷⁹ *Id.*

active participant in the JEDEC Standard Setting Organization, and responsibly inspected all patents which, according to the SSO's rules, were related to the relevant standards. That included inspecting the relevant DRAM patent before making any manufacturing decisions. Having responsibly inspected the available patent information, Infineon began manufacturing. Only then did Rambus seek further claims, which when later issued, would potentially enjoin Infineon's business. Of course, Infineon could have decided not to manufacture anything on the grounds that Rambus – a known patent assertion entity – may potentially seek continuations which would later enjoin their production. But such care would clearly have been excessive, resulting in a massive opportunity cost for both Infineon and its customers. We can be confident that Infineon, therefore, met its duty of care.

Under a negligence rule, the incentives for this type of strategic behavior would diminish. Having adopted all reasonable measures of care, Infineon would not be liable to Rambus. Not only would Infineon avoid damages but they would also not be subject to an injunction. The consequence is that such strategic claiming would be completely unprofitable for Rambus. The financial incentive to secretly seek new claims, and to opportunistically trap the unwary, would be completely undercut.

3. *Monstanto v Schmeiser*: Self-Replicating Technologies

The *Schmeiser* case discussed above has generated much academic commentary. In particular, writers have questioned whether the defendant ought to have been subject to a strict liability rule if, as he claimed, the patented seeds accidentally made their way onto his land through cross-fertilization. British treatise writers, Bently, Sherman, Gangjee and Johnson argue that in cases farmers “through no fault of their own, may be liable for patent infringement when a patented plant ‘invades’ their property”²⁸⁰ and highlight that similar problems could occur in relation to other self-replicating technologies, such as genetically modified animals. Similarly, Christopher Holman argues that “while strict liability might be acceptable for most technologies, the ease with which seeds can spread and reproduce relatively autonomously raises serious public policy concerns.”²⁸¹ But when viewed through the lens of accident law, one sees this is not an isolated incident affecting only biotechnology and self-replicating technologies. This is merely one instance of the broader phenomenon of accidental infringement. And once again, a negligence liability rule would be the appropriate response to such a case.

Assuming for now, the case was truly one of accidental infringement, both Percy Schmeiser and Monsanto could have taken steps to prevent the infringement occurring. Farmers in Percy Schmeiser's position can limit the chances of becoming accidental patent infringers by “fencing out” the invading seeds: this involves creating buffer zones, erecting hedges and other barriers, and “temporal spacing” i.e. planting crops at different times of year from neighboring farms to limit the chance of cross-fertilization, or cleaning rented equipment thoroughly before use.²⁸² All of these measures are costly, but do effectively reduce the possibility of an accident occurring.

The patentee can equally take care to avoid the infringement. One famous example in the seed context is through employing “Gene Use Restriction Technologies” (GURTs).²⁸³ Genetically modified seeds can be further modified such that the plant's offspring do not contain particular traits conferred by the transgenic seed; as a result, if the seed accidentally blows onto another's land, the resulting progeny are not patent-infringing.²⁸⁴ But the precautionary measures at the patent holder's disposal are not limited to complex technological measures. Like George

²⁸⁰ LIONEL BENTLY ET AL, *INTELLECTUAL PROPERTY LAW* 640 (2018).

²⁸¹ Christopher M. Holman, *Bowman v. Monsanto Co.: A Bellwether for the Emerging Issue of Patentable Self-Replicating Technologies and Inadvertent Infringement*, 80 MISS. L. REV. 665, 680 (2015). See Also, Siddharth Khanijou, *Patent Inequity? Rethinking the Application of Strict Liability to Patent Law in the Nanotechnology Era* 12 J. Tech. L. Pol'y 179 (2007).

²⁸² See generally, Jim Riddle, *GMO Contamination Prevention: What Does It Take?* (University of Minnesota) available at <https://www.demeter-usa.org/downloads/GMO-Contamination-Prevention.pdf>.

²⁸³ See e.g. Yi Sang et al, *Gene Use Restriction Technologies for Transgenic Plant Bioconfinement*, 11 PLANT BIOTECH. J. 649 (2013).

²⁸⁴ *Id.*

Selden and the Model T, simply publicizing the nature of the risk to farmers would help.²⁸⁵ Farmers such as Schmeiser can only adopt effective precautionary measures if they are aware of the risk, and the patent holder can make this danger clearer through publicity. Likewise, the patent holder can also “fence in” the travelling seeds by erecting appropriate windbreaks or barriers. The patent holder could contribute financially to such initiatives or contractually require that users of their patented seeds do so as a condition of use. As a result, moral philosopher Zoë Robaey argues that the duty to prevent such contamination is not to be borne entirely by the farmer, nor entirely by the patent holder, but that there is a “collective, or joint, imperative to act responsibly to limit or avoid contamination” through such cross-pollination.²⁸⁶

How would adopting a negligence rule affect incentives in the Schmeiser case? Once again, the main difference would be that such a rule would create incentives for appropriate care on the patentee side. Under a strict liability rule, Schmeiser already faced incentives to adopt reasonable preventative measures. This would remain the case under a negligence rule. This is not only appropriate, but provides a better solution than simply exculpating all “passive infringers”. We should expect farmers in Schmeiser’s position to adopt reasonable measures. Failure to do so should result in the farmer bearing partial responsibility for the accidental infringement. But equally, farmers who do take reasonable measures to avoid the infringement ought to be exculpated, thus shifting part of the responsibility back onto the patent owner.

V. Conclusion

Accidental patent infringement is a significant and growing problem. As the number of broad and amorphous patents grows, the probability that one will inadvertently infringe a patent increases. This Article has argued that, rather than deem all accidental infringers strictly liable, we ought to hold such defendants legally responsible only when they have failed to take reasonable care to avoid the infringement. Applying theoretical economic models found routinely in tort literature, the Article has analyzed the costs and benefits of the various liability rules which could apply to patent accidents. While current doctrine holds patentees strictly liable, this Article has found that either a strict liability rule with a contributory negligence defense or a simple negligence rule would improve social welfare. Accordingly, the Article recommends the introduction of a “patent negligence” defense. Defendants should be liable for accidental infringement of patents, but only when they have failed to take the care of a reasonable person. As Guido Calabresi, in relation to physical injury accidents, pointed out fifty years ago: “Our society is not committed to preserving life at any cost.”²⁸⁷ We should not be committed to preserving patents at any cost either!

²⁸⁵ *Supra* note 41.

²⁸⁶ Zoë Robaey, *Seeding Moral Responsibility in Ownership: How to Deal with Uncertain Risks of GMOs* (2017) (dissertation) available at <https://ethicsandtechnology.eu/wp-content/uploads/downloadable-content/Robaey.pdf>. See also Zoë Robaey, *Gone with the Wind: Conceiving of Moral Responsibility in the Case of GMO Contamination*, SCI. ENG. ETHICS 889 (2016).

²⁸⁷ Calabresi, *supra* note 24, at 17

The City Law School
City, University of London
Northampton Square
London EC1V 0HB

T: +44(0)20 7040 3309

E: law@city.ac.uk



Email enquiries:
law@city.ac.uk



Telephone enquiries Find out more, visit
+44 (0) 44 02 7040 5787 www.city.ac.uk/law

